



# Rocky Flats Environmental Technology Site

## RECONNAISSANCE-LEVEL CHARACTERIZATION REPORT (RLCR)

### BUILDING 707 CLUSTER

REVISION 1

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APPENDIX H – B731, Plenum Deluge/Process Waste Pit

APPENDIX I – B732

APPENDIX J – B707 Cluster Tanks

## ABBREVIATIONS/ACRONYMS

ACM	asbestos-containing material
ARA	airborne radioactivity area
ASD	Analytical Services Division
Be	beryllium
CA	contamination area
CBDPP	Chronic Beryllium Disease Prevention Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
D&D	decontamination and Decommissioning
DDCP	Decontamination and Decommissioning Characterization Protocol
DOE	U.S. Department of Energy
dpm	disintegration per minute
DQOs	data quality objectives
EPA	U.S. Environmental Protection Agency
FCA	fixed contamination area
HCA	high contamination area
HEPA	high efficiency particulate air
HVAC	heating, ventilation and air conditioning
IH&S	Industrial Hygiene and Safety
IHSS	individual hazardous substance site
K-H	Kaiser-Hill
LBP	lead-based paint
LCS	laboratory control samples
LLW	low-level waste
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	minimum detectable activity
MDC	minimum detectable concentration
OSHA	Occupational Safety and Health Administration
PAC	potential area of concern
Pb	lead
PCB	polychlorinated biphenyls
Pu	plutonium
RBA	radiological buffer area
RCRA	Resource Conservation and Recovery Act
RDL	required detection limit
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RLC	reconnaissance level characterization
RLCP	Reconnaissance Level Characterization Plan
RPD	relative percent difference
SVOC	semi-volatile organic compound
TCLP	Toxicity Characteristic Leaching Procedure
TRU	transuranic
UBC	under building contamination
VOC	volatile organic compound

## EXECUTIVE SUMMARY

A Reconnaissance Level Characterization (RLC) was performed to assess physical, chemical and radiological hazards associated with the Building 707 Cluster (i.e., B707, B778, T707S, B708, B709, B711, B711A, B718, and the B707 Cluster tanks). B731 and B732, which are part of the B371 Cluster, were also assessed during this RLC. Findings regarding B709 are reported in the Reconnaissance Level Characterization Report for Group A Facilities. Characterization of hazards is a requisite step in the planning of decontamination and decommissioning activities, and precedes facility strip-out and pre-demolition surveys.

Hazards were assessed based on a review of historical and process knowledge, historical radiological and chemical data, and newly acquired RLC data. Results indicate the presence of radioactive contamination within B707, B778, B731 and B732. Contamination is present on building surfaces (e.g., floors, walls and/or roof), and on and inside equipment and building systems (e.g., gloveboxes and ventilation ducts). Some B707 areas and equipment/systems have high levels of radioactive contamination. Elevated readings were also found on the roofs of B708 and B718. Beryllium contamination is present in Modules F and G of B707, and beryllium is present in several of the B707 gloveboxes and equipment (e.g., in Modules A, F, G, H and J), as well as in B707 piping and the second floor plenums. The Kathabar systems on the second floor of B707 also may be contaminated with metals (e.g., lead and chromium). Asbestos-containing material is present in three of the cluster buildings (i.e., B707, B778 and B708) in several forms (e.g., floor and ceiling tile, other building material, and insulation). There are no other significant chemical or physical hazards. Contaminated areas, hazards and facility classifications are summarized in Table ES-1. Based upon this characterization, B707 is considered a Type 3 Facility, and B778, B708, B718, B731, B732, and the carbon tetrachloride tank are considered Type 2 Facilities. All other facilities within the B707 Cluster (i.e., B707S, B711, B711A, and the 20 other Cluster tanks) are considered Type 1 Facilities.

Pre-demolition surveys or property release evaluations will be conducted on the Type 1 facilities and exterior tanks within this Cluster before they are dispositioned. In addition, contamination on the B708 and B718 roofs will be re-evaluated during in-process characterization. The radioactivity found may be from naturally occurring radioactive material, and not from DOE-added material. If the radioactivity is from naturally occurring material, the facilities will be reclassified as Type 1 Facilities.

After equipment has been removed from the facilities and the facilities have been decontaminated, the demolition of these facilities will generate primarily uncontaminated rubble/structural construction debris, sanitary waste, and low-level radioactive waste. Most process-related equipment items, including ventilation systems, gloveboxes, and machinery are likely to be disposed of as low-level radioactive waste. The Site plans to recycle most or all of the uncontaminated rubble/structural construction debris. Relatively small amounts of waste RCRA-, PCB-, and asbestos-containing waste are anticipated.

Table ES-1 Summary of Hazards and/or Contamination Indicated by the RLC

Bldg/ Facility	Chemical Contamination Indicated?	Contamination Type	Location	Radiological Contamination Indicated?	Contamination Type	Location	Building Classification <sup>1</sup>
B707	Yes	Asbestos  Metals  Beryllium	Multiple, including tiles & insulation  In the Kathabar systems  Modules F & G; also in gloveboxes, other equipment, piping and plenums	Yes	Fixed alpha with some removable	Extensive; on interior bldg. surfaces, on & in equip. & systems, and on roof/exterior walls	Type 3
B778	Yes	Organic solvents	Residues in bldg systems (e.g., tanks and piping)	Yes	Fixed alpha	Minimal; on floors, equip. & roof	Type 2
T707S	Yes	Asbestos	Multiple, including tiles & insulation	No	NA <sup>2</sup>	NA <sup>2</sup>	Type 1
B708	Yes	Asbestos	Bldg. materials Ceiling & floor tile and insulation	Yes <sup>3</sup>	Fixed alpha	Roof	Type 2
B711/B711A	Yes	Asbestos	Piping insulation	No	NA <sup>2</sup>	NA <sup>2</sup>	Type 1
B718	Yes	Asbestos	Piping insulation	Yes <sup>3</sup>	Fixed alpha	Roof	Type 2
B731	No	NA <sup>2</sup>	NA <sup>2</sup>	Yes	Fixed alpha and removable	Interior & roof. surfaces, and on & in equip. & systems	Type 2
B732	Unknown; Not inspected; Airborne radioactivity area	Unknown	Unknown	Yes	Fixed alpha and removable	Interior & roof surfaces, and on & in equip. & systems	Type 2
B707 Cluster Tanks	Yes	Carbon tetrachloride	T206/D-2	No	NA <sup>2</sup>	NA <sup>2</sup>	20 are Type 1 1 is Type 2

<sup>1</sup>Building classification does not include environmental media or bulk media beneath the immediate surface of the floors.

<sup>2</sup>NA - not applicable

<sup>3</sup>Contamination type to be confirmed; activity may be from naturally occurring radioactive material - not DOE-added material.

Radiological Engineering recommends surveys where significant configuration changes are implemented in the building prior to demolition due to unknowns associated w/ movement of bulk material or equipment.

Type 1 facilities are considered "free of contamination," Type 2 facilities contain some radiological or hazardous substance contamination, and Type 3 facilities contain extensive radiological contamination.

The presence of asbestos does not make a facility a Type 2 as long as asbestos is removed pursuant to Site asbestos abatement procedures.

## 1.0 INTRODUCTION

As part of the Rocky Flats Environmental Technology Site (RFETS) Closure Project, numerous buildings and structures will be removed. Among these is the Building 707 Cluster (i.e., B707, B778, T707S, B708, B709, B711, B711A, B718, and the B707 Cluster tanks). This cluster is located in the central part of the Industrial Area (see Figure 1-1). B731 and B732, which are part of the B371 Cluster, were also assessed during this RLC. Findings regarding B709 are reported in the Reconnaissance Level Characterization Report for Group A Facilities. Figures 1-2 and 1-3 show the floor plans for the B707 main floor and second floor, respectively. Facilities within the cluster will no longer support the RFETS mission, and will need to be demolished to reduce Site hazards, risks and/or operating costs.

Before the facilities can be demolished, hazards must first be identified. Hazards identified will be used to plan the decommissioning and demolition work, including addressing worker health and safety and waste management issues. This document presents the existing physical, radiological and chemical hazards associated with the cluster buildings, and classifies the facilities pursuant to the RFETS Decommissioning Program Plan (DPP, K-H, 1998a). The hazards assessment is based on facility histories and process knowledge, operating and spill records, and results of the reconnaissance level characterization (RLC) conducted. The document also presents estimated decommissioning waste types and volumes. The RLC was conducted pursuant to the RFETS Decontamination and Decommissioning Characterization Protocol (DDCP). The content and general outline of this report are consistent with Kaiser-Hill (K-H) guidance on the composition of decontamination and decommissioning (D&D) documentation (FDPM, K-H, 1998b).

### 1.1 Purpose

The purpose of this report is to communicate and document the results of the RLC effort. The purpose includes summarizing the data into a concise, usable format and interpreting the data for use in management decisions, primarily:

- Definition of individual hazards and overall risk associated with facility D&D and managing resulting wastes;
- Preliminary waste classification based on RLC results; and
- Classification of buildings based on hazards identified.

Characterization of facilities is necessary as a prelude to job hazard analyses associated with worker health and safety in the field and to ensure compliance with all applicable regulations and requirements, including waste management regulations.

### 1.2 Scope

This report covers physical, radiological and chemical characterization of the 10 buildings/structures. Chemical characterization was conducted using Colorado hazardous waste management regulations as a means to segregate materials as either

hazardous or non-hazardous waste. Environmental media beneath and surrounding the facilities are not within the scope of this characterization. Both the buildings and environmental media will be dispositioned pursuant to Rocky Flats Cleanup Agreement (RFCA).

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## 2.0 OPERATING HISTORY AND PHYSICAL DESCRIPTION

The B707 D&D Cluster includes the following facilities:

- B707, one of the major RFETS plutonium production facilities
- B778, one of the major RFETS support facilities (craft shops, laundry and lockers)
- T707S, a small storage shed
- B708, the air compressor building
- B711, B711A & B718, a cooling tower, its emergency diesel generator, and the cooling tower pump house, respectively
- B731, the B707 plenum deluge/process waste pit
- B732, the B778 laundry tank and pump vault
- B707 Cluster tanks (T-16, T206, T208 - T221, T223, T-284, T-290, T-324 & T-325)

Descriptions of these facilities and their operations are presented below. D&D planning and execution for the B707 Cluster will be conducted by SETs, which are small, manageable groupings of similar areas and equipment that can be worked independently. There are 17 SETs within the B707 Cluster (see below).

<u>SET #</u>	<u>Areas within the B707 Cluster</u>
1	Module A, including glovebox connected to B778 and B776
2	Module B
3	Module C
4	Module D
5	Module E
6	Module F
7	Module G
8	Module H
9	Module J
10	Module K
11	2 <sup>nd</sup> floor
12	CA and RBA rooms (164, 166, 167, 169, 170, 171, 173, 178, 178A, 181, 182, 183, 184, 184A, 184B, 188, 192, 193, 195, 196, 196A, & 197) and corridors (F - H, J - N, P, & R - V)
13	Administrative ("cold") offices and Corridors A, B, D & E [There is no Module I, and there is no Corridor C, I, O or Q.]
14	Exterior Tanks
15	B708, B711, B711A and B718
16	B707 External Surfaces/Roof
17	B707S, B731, B732 and B778

Hazards are summarized by facility and SET in Section 4.0.

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## 2.1 Physical Description of Building 707

### 2.1.1 General Construction and Foundation

The general construction of the building makes use of walls of pre-stressed concrete twin-tee panels and pre-cast columns and T-beams. The foundations for B707 are cast-in-place concrete caissons and grade beams. The caissons, 3 to 3 ½ ft in diameter and 19 to 38 ft deep, are cast in holes drilled into bedrock. The caissons have concrete caps and are connected by reinforced concrete tie beams that are 16 by 16 in. The concrete grade beams are typically 18 in. wide by 3 ½ to 4 ft deep. The west wall foundation was designed to permit expansion, which was utilized when 707A was built. The below-grade exterior surfaces of the columns, pre-cast panel concrete walls, and the top 6 in. of the exterior surfaces of the perimeter grade beams and footings are covered with coal-tar waterproofing pitch.

### 2.1.2 Walls

The exterior walls, with minor exceptions, are of vertical standing, pre-cast, pre-stressed concrete twin-tee panels tied to the second floor and roof with weld tabs. Pre-cast concrete columns are used to support girder loads. The inside of all exterior walls are insulated with aluminum-foil-backed thermal insulation and covered with gypsum board. All joints in the pre-cast concrete panels are caulked with a silicone sealant.

The exceptions to the twin-tee construction include the following: (1) radiography vaults that are cast-in-place, reinforced concrete 3 ft 8 in. thick that form the east wall, roof, and interior walls of the vault in the single-story section; and (2) the exterior wall of the shipping and receiving area of the single-story section, the elevator enclosure, and the stairway enclosures that are made of filled concrete block. This makes up the southern half of the single-story section. The northern half is of the twin-tee type construction.

The interior wall separating the single-story section from the two-story part of the building, the walls around the elevator shaft, the three stairways to the second floor, and the fire-break walls on the second floor are all 8 in. concrete block. Walls of the production modules are steel studs covered with 5/8 in. gypsum board, finished with ¼ in. hardboard wainscot 4 ft high. Other interior walls (as in offices and restrooms) are of comparable steel-stud construction, but the covering varies. For example, shower areas have metal lath and plaster covered with ceramic tile. Storage vaults for nuclear material have walls of either poured-in-place concrete or filled concrete block. Interior walls are generally finished with enamel paint and exterior walls with exterior masonry paint. The walls of the restrooms have glazed ceramic wall tile. The control room, offices and shops on the second floor have three sides constructed of steel studs covered with 5/8-in. gypsum board. The fourth wall is either the outside wall of the building or one of the cement-block firebreak walls.

The walls could have been initially painted with lead based paint as the plant site used lead based paint until the 1980's. The joint taping compound may have contained asbestos when it was applied to the joints.

### 2.1.3 Floors

The ground-level floors are 6-in. thick, reinforced concrete slabs placed in sections on sand and gravel sub-bases. A polyethylene vapor barrier, 0.010 in. thick, is installed under the floor slabs. The second floor is pre-cast, pre-stressed concrete twin-tee panels with a 3 in. concrete overcoat. The second floor is supported by pre-cast, inverted T-beams on pre-cast, square concrete columns. Floors in the production modules, on the ground floor, are covered with epoxy paint except, Modules G and H, which had a concrete hardener and sealant applied to them. Ground-floor corridors in the production area are painted with epoxy paint. In Corridor G the hatch that provides access to C Pit is raised 2 in. to provide a dike to keep out water in the event that the fire system is activated in order to prevent a criticality accident in C Pit. There is a ramp leading up to the hatch in order to allow movement of cart traffic in the corridor. Concrete sealant was applied to the second floor. Office area floors are finished with resilient floor tile, although some areas are covered with indoor-outdoor carpet.

Because of the time when the building was constructed, the floor tile could have asbestos-containing material (ACM) in it. If the carpet was put down over the tile it could be on ACM.

### 2.1.4 Ceilings

The production modules have air diffusing, metal-pan, suspended ceilings. All restrooms and janitor closets have suspended, gypsum-board ceilings; corridors surrounding the modules have suspended acoustical-panel ceilings. The offices in the single-story section of the building and the offices and shops on the second floor have suspended acoustical-panel ceilings. There are no ceilings in the second floor mechanical equipment areas or in Module H. The control room ceiling is of gypsum-board construction with fluorescent lights mounted flush to the ceiling.

### 2.1.5 Roof

The roofs on the two-story and single-story sections are of twin-tee construction. They are covered with 2 in. thick, lightweight concrete topping. Insulation was installed over the topping, and a grid of 2 by 4 in. wood, covered with  $\frac{3}{4}$  in. plywood, covers the insulation. An elastic roofing material (Neoprene Hypalon<sup>®</sup>) forms the weather-proof surface. Pre-cast concrete, inverted T-beams on pre-cast columns support the roof decks. The center section of the single-story section of the building is the radiography vault and is cast in-place concrete 3 ft 8 in thick that goes to the roofline.

### 2.1.6 Doors

Doors from the cold offices are metal with large safety-glass windows in them. In the production area the doors to the modules are metal with 2 ½ by 3 ft wire-mesh windows. There is at each door to the modules a two-inch dike that is used to contain liquid spills in the room. There is a ramp built into the dike to allow wheeled traffic to enter the module. All modules, except G, H, J and K, have large metal doors in the walls for the

removal and installation of equipment. The dock area man-doors are metal with small glass-mesh windows in them. Truck doors are steel roll-up type, wall-face mounted, and operated by electric motors. Emergency exit doors from the production area are metal with no windows in them, and outside the door is a steel-bar security cage.

## 2.1.7 Interfaces

There are two covered passageways leading from Building 778 to Building 707. The building terminology for the passageways is tunnels. The east tunnel leads from the locker rooms in Building 778 to the cold offices in Building 707 and the west one leads into the production area through a one-way, in and out security post. Overhead in the west tunnel, Corridor D, is a chainveyor, S8, that allowed for the transfer of material from the Building 777 production area to the production lines in Building 707. Also there is piping that supported the transfer of organic waste to Building 774 via Building 777 from the C-Pit tank system.

Chainveyor S1 in Building 707 runs between Modules C, D and E with the north termination point in Module C at the transfer point between Chainveyors S8B, S5, and S21. In Module E the termination is at the transfer point between Chainveyors S7, S10, and S11. In Module D there is a transfer point with the production line and Chainveyors S6, S9, S10 and S13.

In Module A Chainveyors S3A and S3B run down the length of the production line and meet approximately halfway down the line. The east-end of S3B terminates at the transfer point for Chainveyors S8 and S8A. Chainveyor S3A has no transfer point at the west-end of the line.

In Module B Chainveyor S4 runs the full length of the production line. The east-end transfer point is between Chainveyors S8A, S8B and S21. At Glovebox 65 there is a transfer point to Chainveyor S22. There is no transfer point at the west-end of S4.

In Module C Chainveyor S5 runs the length of the production line. At the east end at Glovebox 15 the transfer point is between Chainveyors S8B, S1 and S21. The transfer point at the west-end is to Chainveyor S22.

In Module D Chainveyor S6 runs the full length of the production line. There are transfer points at the east and west ends of the line. The west-end transfer point is between Chainveyors S13, S15 and S22. East-end transfer point is between Chainveyors S1, S9, S10 and S13.

In Module E Chainveyor S7 runs the full length of the production line. There are transfer points at the east and west ends of the line. The east-end transfer point is between Chainveyors S1, S10 and S11. In the west-end the transfer point is to Chainveyor S15.

Chainveyor S8 runs from Room 131, the development line, in Building 777 to the east transfer point between Chainveyors S3B and S8A in Module A.

Chainveyor S9 runs between the east transfer point between Chainveyors S1, S6, S10 and S13 in Module D and Room 167, the old radiography vault.

Chainveyor S10 runs between the east transfer point between chainveyors S1, S6 and S13 in Module D and the east transfer points for Chainveyors S1, S7 and S11 in Module E.

Chainveyor S11 runs between the east transfer point between Chainveyors S1 and S7 in Module E and the Room 125A downdraft table, the super-dry room, in Module F. An appendage of this chainveyor runs from the downdraft table in Room 125A to the downdraft table in Room 125 B.

Chainveyor S13 is used as an overhead storage line that connects the east and west ends of the Chainveyor S6 that runs the length of the production line in Module D.

Chainveyor S15 is used as an overhead storage line in Module E and has transfer points at the west-ends of the production lines in Modules D and E with Chainveyors S6 and S7.

Chainveyor S16 runs from the J Vault in Module J down the length of the production line, crosses overhead to the west-end of K Module, down the length of the production line to the transfer point for the X-Y Retriever Vault, and at that point it transfers to Chainveyor S18. At Glovebox 35 in K Module there is a transfer point to Chainveyor S20.

Chainveyor S18 runs from the transfer point at the X-Y Retriever in Module K to Glovebox 90 in Module B.

Chainveyor S19 runs from Glovebox 105B in Module B to Glovebox 110 in Module C where it can transfer to Chainveyors S6 and S20.

Chainveyor S20 runs from Glovebox 35 in Module K, where there is a transfer point to Chainveyor S16, to Glovebox 110 in Module C, where it can transfer to Chainveyors S5 and S19.

Chainveyor S21 in Module C is used as an overhead storage line and because it is opposite Glovebox 15 in Module C, it can transfer to Chainveyors S1, S5 and S8B. It goes to Module B where it transfers to Chainveyors S4, S8A and S8B.

Chainveyor S22 connects Modules B, C and D. In Module B at Glovebox 65 it transfers to Chainveyor S 4. In Module C at the west-end of Chainveyor S5 is a transfer point and at the west-end of Chainveyor S6 transfers can be made to Chainveyors S13 and S15.

Chainveyor S23 is water-walled and used as an overhead storage line. In Module B at Glovebox 60 it transfers to Chainveyor S4.

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Chainveyor S24 runs from a point outside J-Vault, where transfers can be made to Chainveyor S16, to Module A opposite Glovebox 65 where transfers to Chainveyor S3B can be made.

### 2.1.8 Utilities

The 13.8 kV electricity supply to the building is stepped down for building use voltage at seven transformers, six on top of the radiography vault and one on a concrete pad on the ground. Stepped-down voltages are 2400 and 480 volts and are distributed to motor control centers (MCCs) and emergency motor control centers (EMCCs) on the second floor of the building. Four transformers supply 480 volts to equipment MCCs, one supplies 480 volts to the EMCCS and the UPS system, one supplies 2400 volts to equipment on the second floor, and one supplies 480 volts to the lighting panel distribution system.

Plant and instrument air are supplied to the second floor distribution points from the air compressors in Building 708.

Breathing air is supplied to the building from the compressor in Building 708 to the necessary drops.

Nitrogen for inerting the production lines is piped to the building from the nitrogen plant, Building 223. If the nitrogen plant should have to shut down, there is a liquid nitrogen tank located at the southeast corner of the building that can be used in an emergency to supply the building.

The argon supply is from a liquid supply tank located at the southwest corner of the building.

Carbon tetrachloride supply to the building was from a tank located north of the building. There is a berm around the tank to contain the contents of the tank in case of a leak.

Steam is supplied to the building from the steam plant, Building 443, at 115 pounds pressure to the pressure reducing station on the second floor, where it is reduced to 30 psi.

Tower water used to extract heat from the closed-loop cooling heat exchangers comes from Cooling Tower 711.

Ethylene glycol water (brine) coolant system comes from Building 708 and is used to extract heat from the process chilled-water system. Both systems are closed-loop systems to prevent cross-contamination with radioactive material in case of an accident. There have been no leaks in the brine system.

Helium was supplied to the building from a bank of tanks located to the south of the building.

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### 2.1.9 Heating, Ventilation and Air Conditioning (HVAC)

The HVAC system provides the desired volume changes, temperature and humidity control of the atmosphere within areas of the building while maintaining confinement of radioactive material by means of pressure differential control and exhaust air filtration. The building ventilation system exhaust fans maintain glovebox internal pressure lower than building internal pressure, and the building internal pressure lower than outside atmospheric pressure. There are nine supply systems in the production areas of the building and a separate system for the office area.

A separate HVAC system supplies air to the offices and corridors in the northern portion of the single-story section of the building. The air-handling unit is located in the ceiling above the corridor. Most of the air is recirculated, with only about 20% fresh air coming from the outside. Air entering the handling unit is drawn through medium-efficiency filters and is heated or cooled by passing it over chilled-water or hot-water coils.

The general dry-air (GDA) system provides continuous recirculation of clean, conditioned, low-humidity air to most of the plutonium handling areas of the building. The GDA system consists of nine similar conditioning units complementing the modular arrangement of the building. Although the conditioning units are independent, they are grouped to share common supply and exhaust plenums. Each conditioning unit blends outside air and recirculated air drawn from the second floor equipment room. The outside air to recirculated air ratio is 20% to 80%. The air-flow path is that the recirculated air is drawn through high efficiency particulate air (HEPA) filters, mixed with outside air, dehumidified using lithium chloride, reheated, and distributed to the appropriate module and corridor. The exhaust flow path is that the air is drawn from the modules, through two stages of HEPA filtration, with 20% being exhausted to the outside and the rest recirculated to the second floor equipment room. Corridor air is exhausted through modules exhaust drops so that the corridors have a positive pressure flow to the modules for contamination control. GDA systems supply all the radiography area, shipping and receiving in the south half of the single-story section of the building, corridors in the production area, and the modules, except the east half of Module G that has special humidity and temperature controls needed for its operation. The east half has its own supply system.

The glovebox dry air system supplies dry air to all gloveboxes and conveyor lines that do not require an inert atmosphere. This is a single-pass system that draws air from the second-floor equipment room, filters it through HEPA filters, and dehumidifies and reheats it with the use of steam and hot water coils before distribution to the gloveboxes. The exhaust from the gloveboxes then passes through four stages of HEPA filtration before being exhausted to the atmosphere. Gloveboxes in Modules D and E and conveyor systems that do not need inert air are serviced by this system. There are two inert atmosphere systems for gloveboxes and conveyors in Modules A, B, C, J, K and the storage vault in Module K. These systems maintain a dry, inert atmosphere of nitrogen containing between 1% and 5% oxygen by volume. The nitrogen for both systems is supplied to the building at 125 psig and reduced to 15 psig for general building use and further reduced for the systems to 3 psig. The demand for

nitrogen is determined by the requirement of maintaining a nominal oxygen level of 3.5%. Each system exhausts some of the inert gas to the atmosphere. The inert systems consist of a chilling coil, reheat coil, recirculating fan, four-stage HEPA filter plenum, and exhaust fan.

All ventilating systems, with the exception of the office system, have parallel systems that can be operated in case of emergency or when maintenance is to be performed on the running system.

## **2.2 Description of Building 707 Operations**

### **2.2.1 Historical Processes**

Building 707 was constructed to increase the safe handling, storage, casting, forming, machining and assembly of plutonium weapons "pits" and subassemblies. Safe handling was increased by the use of chainveyors to transport material and parts between modules. Storage, forming and machining safety was increased by all operations being performed in gloveboxes that had an inert atmosphere. Storing material in an inerted vault enhanced material storage safety, and handling was performed by the use of a remotely operated X-Y Retriever to reduce operator exposure. Casting operations consisted of casting shapes for machining, making ingots to be used in the make up of casting charges, and casting shapes for rolling operations. Forming operations consisted of rolling the cast shape to the desired thickness and forming the hemishell to the proper shape using a hydroform press. Machining operations machined the shaped parts to their final dimensions. After machining, the hemishells were inspected and assembled into pits by welding in an electron beam welder under vacuum. The gloveboxes for inspection and assembly were dry-air gloveboxes in which the water in the atmosphere was reduced and controlled to low levels. Assembled pits were then sent to the super-dry room to be covered with the outer subassemblies that allowed for safe handling of the weapon outside of the gloveboxes.

### **2.2.2 Current Status**

Processes and equipment contained in the modules B and C in Building 707 were dedicated to the production and assembly of plutonium (Pu) pits in the past. Presently the modules A, D, E, J and K are being used for the stabilization of wastes, size reduction of Pu ingots and parts, and the destruction of classified shapes. If the module is not being used for stabilization or destruction processes it is being used to store and stage waste. Utilities to the modules that the equipment in the various gloveboxes that might be needed in the past and the present are; argon, instrument air, chilled water, cooling water carbon tetrachloride, 1,1,1-trichloroethane, helium, Freon® 113, chloroform, machine oil, machine coolant, plant air and hydraulic oil. If small amounts of liquids are needed in the glovebox in the past they can be added through a funnel on top of the glovebox that is valved off to prevent contamination of the room. Electricity that is needed is 110 volts for the fluorescent lights in the ceilings of the corridors and rooms, on top of the gloveboxes, drops in the gloveboxes, and outside to power hand

tools. The machine tools require 240 or 480 volt electricity to operate. All equipment on the second floor is still being used in support of ventilation of the building and various safety systems needed for safe operation of the building. Equipment that is not needed for present operations in the building have been deactivated and the power turned off at the appropriate motor control center.

Some areas and equipment contain nuclear material. This material is containerized, or non-containerized and referred to as either in-process material or holdup. In-process material is non-containerized nuclear material in a process area, excluding holdup. Holdup is material remaining in process equipment and facilities after the in-process material, stored material, and product have been removed.

As of February 17, 2000, there was over 61,000 grams of holdup in B707, all of which was plutonium. This holdup is contained in the chainveyor system, numerous gloveboxes, hoods, plenums, heat chambers, test vessels, pumps, filter housing, ductwork, ventilation systems associated with process control devices, and the C Pit. Holdup locations and quantities are presented in bimonthly holdup inventory reports (refer to SSOC, Holdup Inventory Report, 2/17/00, PQHT-00.056). Holdup information is also summarized in Section 4.0.

The presence of in-process nuclear material; other radioactive material; radioactive, chemical, and mixed waste; and chemical product is indicated in the module-specific write-ups below and in Section 4.0. B707 RCRA-regulated units subject to formal RCRA closure are listed in Table 2-1, and B707 idle equipment with hazardous materials inventory are listed in Table 2-2.

Table 2-1 B707 RCRA-Regulated Units

SEI #	Unit #	Blog	Unit Description	Regulatory Status	EPA Waste Codes
1	707.1	707	Container Storage Module A, Rm. 100	PERMITTED	D001-D012, D015-D019, D021-D028, D033, D035-D038, D041-D043, F001-F003, F005-F009, U227
1	707.1	707	Container Storage, Module A, Gloveboxes A-25, A-30 (90.106), A-35, A-45, and A-55	PERMITTED	D001-D012, D015-D019, D021-D028, D033, D035-D038, D040-D043, F001-F003, F005-F009
1	707.3A	707	Salt Stabilization Process: Module A, Gloveboxes A-70, A-75, A-80, A-85, A-90, A-100, A-120, A-125 (90.106), and Furnaces	PERMITTED	This unit has never been activated and never used to store waste; therefore waste codes are not applicable.
1	92.001-92.019	707	Ancillary Equipment to C-Pit Tanks System Beneath Center-Line and in overhead and in Corridor D	RCRA STABLE per 99-DOE-03494 (1/28/99); approved by CDPHE 8/23/99; currently subject to quarterly inspections.	F001, F002
2	92.001-92.019	707	Ancillary Equipment to C-Pit Tanks System Beneath Center-Line and in overhead	RCRA STABLE per 99-DOE-03494 (1/28/99); approved by CDPHE 8/23/99; currently subject to quarterly inspections.	F001, F002
2	707.1	707	Container Storage, Module B	PERMITTED	D001-D012, D015-D019, D021-D028, D033, D035-D038, D040-D043, F001-F003, F005-F009, U227
3	92.001-92.019	707	Tanks V-1 - V8, V12 - V19, V-30, V-31, and V-100 in Module C Pit	RCRA STABLE per 99-DOE-03494 (1/28/99); approved by CDPHE 8/23/99; currently subject to quarterly inspections.	Tanks-F001, F002 Module C Pit-Inactive-4/6/00
4	92.001-92.019	707	Ancillary Equipment to C-Pit Tanks System Beneath Center-Line and in overhead	RCRA STABLE per 99-DOE-03494 (1/28/99); approved by CDPHE 8/23/99; currently subject to quarterly inspections.	F001, F002

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SET #	Unit #	Unit Description	Regulatory Status	EPA Waste Codes
4	707.3C	707 Dry Residues Repackaging Process: Module D, Gloveboxes D-30, D-35, D-40, D-45, D-75, D-90, D-95, Module F, Crusher, Saws, Milling Machine, and Hand Tools	PERMITTED	This unit has never been activated and never used to store waste; therefore waste codes are not applicable.
5	92.001 -92.019	707 Ancillary Equipment to C-Pit Tanks System Beneath Center- Line and in overhead	RCRA STABLE per 99-DOE-03494 (1/28/99); approved by CDPHE 8/23/99; currently subject to quarterly inspections.	F001, F002
5	707.1	707 Container Staging, Module E, Rm. 120	PERMITTED	D001-D012, D015-D019, D021-D028, D033, D035- D038, D040-D043, F001-F003, F005-F009
5	707.1	707 Container Storage, Module E, Gloveboxes E-55 and E-115	PERMITTED	D001-D012, D015-D019, D021-D028, D033, D035- D038, D040-D043, F001-F003, F005-F009
5	707.3B	707 Ash Stabilization Process: Module E, Gloveboxes E-20, E- 25, E-35, E-60, E-65, E-70, E- 95, E-105, E-110, E-125, Hammer Mill, Sieves, and Furnaces	PERMITTED	D004-011, F001, F002, F005-F007, F009
6	92.001 -92.019	707 Ancillary Equipment to C-Pit Tanks System may exist below floor plates	RCRA STABLE per 99-DOE-03494 (1/28/99); approved by CDPHE 8/23/99; currently subject to quarterly inspections.	F001, F002
6	707.1	707 Container Storage Module F, Rm. 126	PERMITTED	
7	92.001 -92.019	707 Ancillary Equipment to C-Pit Tanks System exists in room 131 and piping in overhead.	RCRA STABLE per 99-DOE-03494 (1/28/99); approved by CDPHE 8/23/99; currently subject to quarterly inspections.	F001, F002
7	707.1	707 Container Storage, Module G	PERMITTED - Originally permitted for C-Cell enclosure and drum crusher that was never installed in room 130A. Permit expanded to allow for container storage most areas of Module G	D001-D012, D015-D019, D021-D028, D033, D035- D038, D040-D043, F001-F003, F005-F009

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SET #	Unit #	Bldg #	Unit Description	Regulatory Status	EPA Waste Codes
9	90.74	707	Container Storage, Module J Vault, Rm. 141	INACTIVE mixed residue container storage unit.	Inactive-1/11/00 D004-D012, D015-D019, D021-D028, D033, D035-D038, D040-D043, F001-F002, F005-F009
9	92.020	707	Pu Stabilization Unit, Module J, Glovebox 25	N/A; to be administratively withdrawn; never used for hazardous waste.	
9	92.021	707	Pu Stabilization Unit, Module J, Glovebox 60	N/A; to be administratively withdrawn; never used for hazardous waste.	
9	707.1	707	Container Storage, Module J Storage Racks	PERMITTED for storage of Liquid waste in racks.	D004-D012, D015-D019, D021-D028, D033, D035-D038, D040-D043, F001-F002, F005-F009
9	707.1	707	Container Storage, Module J, Gloveboxes J-35 and J-55	PERMITTED - West side of module used for container staging to support glovebox unit operations.	D004-D012, D015-D019, D021-D028, D033, D035-D038, D040-D043, F001-F002, F005-F009
10	707.1	707	Container Storage, Module K, Gloveboxes K-65 and K-75	PERMITTED	D004-D012, D015-D019, D021-D028, D033, D035-D038, D040-D043, F001-F002, F005-F009
12	707.1	707	Container Staging, Rm. 167	PERMITTED	D004-D012, D015-D019, D021-D028, D033, D035-D038, D040-D043, F001-F002, F005-F009
12	707.1	707	Container Storage, Rm. 181	PERMITTED	D004-D012, D015-D019, D021-D028, D033, D035-D038, D040-D043, F001-F002, F005-F009
12	707.1	707	Container Storage, Rm. 182	PERMITTED	D004-D012, D015-D019, D021-D028, D033, D035-D038, D040-D043, F001-F002, F005-F009

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SET #	Unit #	Bldg.	Unit Description	Regulatory Status	EPA Waste Codes
12	707.1	707	Container Storage, Rm. 183	PERMITTED	D004-D012, D015-D019, D021-D028, D033, D035-D038, D040-D043, F001-F002, F005-F009
12	707.1	707	Container Storage, Rm. 196	PERMITTED	D001-D012, D015-D019, D021-D028, D033, D035-D038, D040-D043, F001-F003, F005-F009, U227
12	92.001 -92.019	707	Ancillary Equipment to C-Pit Tanks System in Overhead of Corridor G, J, K, and H	RCRA STABLE per 99-DOE-03494 (1/28/99); approved by CDPHE 8/23/99; currently subject to quarterly inspections.	F001, F002
17	40.16	732	Laundry Waste Tank	ITERIM STATUS - Inactive -To be Closed	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009

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**Table 2-2 B707 Idle Equipment with Hazardous Materials Inventory**

SET	Equipment Number	Module/ Room/ Glovebox	Description	Material	Rad	Quantity
NA	707-0002	NA/ Outside/ NA	Carbon tetrachloride (tet) tank #26150 and ancillary equipment (NDT #0624)	Carbon tet	No	Dry Residue
1	707-0024	A/100/A100	Heald T-base lathe	Coolant oil Carbon tet	Yes	½"
3	707-0035	C/110/C105	Harding lathe	Coolant oil Carbon tet	Yes	1/16" – 1/8"
3	707-0036	C/110/C115	Lodge & Shipley lathe	Coolant oil Carbon tet	Yes	>2"
3	707-0037	C/110/C125	Chucker lathe	Coolant oil Carbon tet	Yes	½"
3	707-0039	C/110/C25A	Heald T-base lathe	Coolant oil Carbon tet	Yes	¼"
3	707-0040	C/110/C25B	Heald T-base lathe	Coolant oil Carbon tet	Yes	¼"
3	707-0042A	C/110/C45A	Heald T-base lathe	Coolant oil Carbon tet	Yes	2"
3	707-0043	C/110/C45B	Heald T-base lathe	Coolant oil Carbon tet	Yes	2"
3	707-0044	C/110/C65A	Heald T-base lathe	Coolant oil Carbon tet	Yes	½"
3	707-0045	C/110/C65B	Heald T-base lathe	Coolant oil Carbon tet	Yes	½"
2	707-0067	B/105/B105	Rolling mill	Cooling oil Carbon tet	Yes	10 gal
2	707-0068	B/105/B20	Lodge & Shipley lathe	Cooling oil Carbon tet	Yes	< 10 gal
3	707-0071	C/110/C60	Heald T-base lathe	Cooling oil Carbon tet	Yes	10 gal

**SET 1 - Module A**

Module A was in the past was used to cast plutonium parts and machine beryllium parts and was where transfers from the conveyor from 776 could be made. There are four tilt pour furnaces, gloveboxes A25, A35, A45 and A55, respectively that were used in production operations. Equipment associated with operations in the tilt-pour furnaces is a scale to weigh the casting charge. The utilities needed for these casting furnaces are electricity, carbon tetrachloride, cooling water and helium. Gloveboxes supporting this operation are, A10 a storage glovebox, A20 a mold coating glovebox, and A30 the

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button storage glovebox. Glovebox A65 was used to scarf the molds after they were used in casting and put them in a bagout drum. All of the gloveboxes are serviced by Chainveyor S3B and are in the east half of the module. There is a door between Chainveyors S3B and S3A, which serves the west half of the production line and at the present time, is locked out to prevent its use. Gloveboxes A70, 80, 90, 100, 110 and 125 were used to machine beryllium. The gloveboxes contained lathes and milling machines. Gloveboxes A75 and A85 were dimensional measuring boxes with A75 containing 3 granite tables and an optical comparator and A85 a Sheffield Rotocon sweep gage. Glovebox A70 was used to cut sample coupons for analysis. A120 was a filtration glovebox to off load oil cart, filter and transfer to a slab wall tank for transport to the C Pit tanks. Waste carbon tetrachloride from spill cleanup may have been introduced into the CPit tanks system via this glovebox.

Presently Module A is used to stabilize a variety of salts (i.e., electro-refining, molten salt extraction, direct oxide reduction, and salt scrub). To accomplish this operation pit furnaces were installed within Gloveboxes A70, 80 and 110. The original gloveboxes A80 and A110 were removed as part of the preparation for salt processing. A segmented gamma scan counter was added to Glovebox A90 to determine the amount of material in the stabilized salt. A gamma scan counter was added to Glovebox 125 to increase the counting capabilities of the salt reprocessing facility. At the present time the salts are being diluted with reagent grade chloride salts. These reagent salts are the only chemicals, other than the salts to be stabilized, that are used in the building. A RCRA permit was issued for this process but never exercised since the salt feed material was determined not to meet the definition of a RCRA reactive waste.

Gloveboxes that were installed but never initially went hot include A15 and A67. Box A15 was to be a burn box to burn skulls and re-burn oxide. This box never originally went hot for the original purpose. The original equipment was removed, and new equipment was installed to remove plutonium from highly enriched uranium parts. This operation is now inactive, as all the uranium parts have been decontaminated.

Research and Development installed Glovebox A40 to develop a die-casting process for plutonium parts, this process never worked and the box is inactive at the present time.

Between Gloveboxes A85 and 125 there is a containment room that houses a Harwood press that was at the present time inactive.

Gloveboxes A25, A30, A35, A45, and A55 were permitted for RCRA storage to manage cans of IDC H-61 that had been removed from the 707 ducting. Residue sampling indicated that this material exceeded RCRA limits for heavy metals and required management. Since these gloveboxes had active heat heads, they were permitted to store the material. Subsequently the material was repackaged and removed from the gloveboxes.

A common drain line runs the length of the module for the collection of waste coolant and solvents. This line goes to the C-Pit tank system via a below grade pipe way. A transfer line from C-Pit to Building 777 runs through the overhead of the module.

## SET 2 - Module B

Module B was used to roll and shape Plutonium ingots into parts. At present no operations are being performed in this module. Gloveboxes in the module are described below.

- Currently the gloveboxes that were removed from Module J are being stored here awaiting size reduction.
- The B20 glovebox is a lathe box that has machine coolant and carbon tetrachloride supplied to it.
- The B25 glovebox has two extensions off it, 25A is a Density balance glovebox and 25B has a thermocycle unit in it. Utilities supplied to this glovebox are Freon® 113, trichloroethane, and cooling water.
- Glovebox B40 was a development glovebox for a continuous casting operation that was never successful, and the box never went hot.
- B50 is a bagout glovebox.
- B60 is a transfer glovebox between Chainveyors S23 and S4.
- Glovebox B65 has the debrimming unit in it to debrim the hemishells after forming and is the transfer point to Chainveyor S22.
- Gloveboxes B70 and B80 both contain a thermocycle unit.
- Glovebox B75 is a connecting box between gloveboxes B65 and B85 and has three extensions off it that contain a post form furnace in each one.
- Glovebox B85 contains the hydroform press and has as utilities hydraulic oil and machine coolant. At the base of the press is a horseshoe shaped pencil tank that collected liquids from this glovebox.
- Glovebox B90 is the transfer point between Chainveyors S18 and S4.
- Glovebox B95 has two extensions that contain Brew furnaces in 95 A & B.
- Glovebox B100 contains the rolling mill, square shear, and roller table. Utilities for the rolling mill are hydraulic oil and carbon tetrachloride.
- Glovebox B105 is the connecting glovebox between B100, Chainveyor S4 and Gloveboxes B95 and B110 and it is also the transfer point to Chainveyor S19.
- Glovebox B110 has two Brew furnaces in two extensions off it. Helium is needed to operate the Brew furnaces.
- A common drain line runs the length of the module for the collection of waste coolant and solvents. This line connects to a similar drain from Module A and goes to the C-Pit tank system via a below grade pipe way. A Transfer line from C-Pit to Building 777 runs through the overhead of the module.

## SET 3 - Module C

Module C was where the pits were machined to their final dimensions, and at the present time no operations are being conducted in the module. Utilities needed for the machining operations were carbon tetrachloride, machine coolant, hydraulic oil, instrument air, process cold water and Freon 113®. Freon 113® was added to the machining areas in small quantities through funnels on top of the boxes. All other utilities are piped directly to the gloveboxes. Electricity is supplied to the glovebox at the

voltage needed to perform the operation needed, and could be 110, 220 or 480-volt. Gloveboxes in the module are described below.

- Glovebox C15 is a bagout station, and is the point where transfers can be made to Chainveyors S1, S5, S8B and S21.
- Gloveboxes C20 & 30 are cold boxes and contain 3-axis mills.
- Glovebox C25 has two T-base lathes contained in extensions C25A&B. Glovebox C40 has two drill presses in it.
- Glovebox C45 is another T- base lathe glovebox, like C25, with lathes contained in C45A&B.
- Glovebox C50 is a dimensioning box containing a helium-neon laser-measuring device. C60A contains a T-base lathe.
- Glovebox C65 is configured like C25 and 40 with T-base lathes in C65A&B.
- C70 is a measuring inspection glovebox.
- Glovebox C75 is a storage glovebox for lathe chucks.
- Gloveboxes C80 & 85 are measuring gloveboxes containing Sheffield Rotocon Sweep gages.
- Glovebox C90 is a density weigh glovebox. The density fluid is Freon® 113 and is added through a funnel on top of the box.
- Glovebox C95 contains a jig borer.
- Glovebox C105 has a lathe in it.
- Glovebox C110 contains the briquetting press where all scrap turnings from the machining operations and trimmings from the forming operation were degreased, using carbon tetrachloride, and pressed into briquettes to be sent back to the foundry for recasting or storage in the X-Y retrieve in K module. It is also the transfer point between Chainveyors S5, S19 and S20.
- Gloveboxes C115 and C125 contain lathes.
- A common drain line runs the length of the module for the collection of waste coolant and solvents. This line goes to the C-Pit tank system. Transfer lines from C-Pit run trough the overhead of the Module.

The machining glove boxes in this module may contain residual machining oils, carbon tetrachloride and material fines in hard to reach places.

Waste operations for the cleaning and disposal of spent solvents and machining oil were conducted in the C Pit in the basement under Module C and Corridor G, and or Glovebox C120 in Module C.

Operations started with transfer of carbon tetrachloride, Freon® 113 and machining oils, which were filtered at the source through fulflo filters and sent to the pencil tanks, V1-8 and V12-19 in "C" pit. From the pencil tanks the wastes were sent to Glovebox C120 and through a bank of fulflo filters and back to C Pit to Collection Tank V-30. At this point the waste was sampled for radioactive material content and if it was above discard limits it was sent back through the filters in Glovebox C120 and returned to Tank V-30. If the results were below discard limits the liquid was sent to Tank V-31 and sampled. If the results of the sampling came back high the liquid was pumped through Fulflo filters in Glovebox 206-837 and back to Tank V-31 and sampled again. If the results were

below discard limits, the liquid was sent to Building 774 for disposal. Tanks V-30&31 are annular tanks for criticality purposes. Trichloroethane from vapor degreasing operations in Modules D, E, and G were sent to the Sump Tank, V-100, in C Pit where they went through the same procedure as the waste oils and carbon tetrachloride. Tank V100 is a Raschig Ring-filled tank.

#### SET 4 - Module D

When Module D was in operation it was the final dimensional measuring module for the machined plutonium parts. It was also where the parts were serialized and cleaned before being sent to final assembly. Utilities needed for this module are trichloroethane, carbon tetrachloride, watch oil, plant air and instrument air. The solvents and oils were added to the gloveboxes by pouring the liquid into a funnel on top of the glovebox and opening a valve to introduce them to the line. Electricity voltage is 110, 220 and 480-volts to operate the equipment in the module. Presently work being done in the module is the destruction of classified graphite shapes and repackaging of some other solid waste. Gloveboxes in the module are described below.

- Glovebox D20 was where the parts were serialized using a grit-marking machine and then was cleaned in an ultrasonic cleaner in trichloroethane.
- Glovebox D25 has been removed.
- Glovebox D30 was a precision weighing box. Presently there is a C Cell connected to this box, and repackaging operations are performed here.
- Glovebox D35 was a precision weighing box. Presently it is used to destroy classified graphite shapes using a hammer mill.
- Glovebox D40 was a surface plate inspection glovebox, and the utilities in the box were carbon tetrachloride and watch oil. Presently it is used as a bagout box.
- Glovebox D45 was a surface inspection glovebox, and the utilities to it included carbon tetrachloride. Presently the box is not in operation.
- Glovebox D50 contains a laser (helium-neon) sweep gage that is not in use. Utilities needed for this operation were carbon tetrachloride and watch oil.
- Gloveboxes D55 and D65 are identical boxes to D50 and are presently inactive.
- Glovebox D70 was where the Standards Lab calibrated the gages used in the various operations in the inspection gloveboxes and presently is inactive.
- Glovebox D75 had various inspection equipment in it for inspection operations. Carbon tetrachloride was needed for operation. Presently it is being used to destroy classified graphite shapes using a hammer mill.
- Glovebox D80 was used as a general workstation and is not in use at the present time. Carbon tetrachloride was needed for operation.
- Glovebox D85 was an optical comparator glovebox and is not in use at the present time. Carbon tetrachloride was needed for operation.
- Box D90 was a gage calibration glovebox and is presently used to collect and bagout trash. Carbon tetrachloride was needed for operation.
- Glovebox 95 was used as the finish gage box. Presently it is a drum dump box for entry of the graphite into the glovebox line for processing.
- Gloveboxes D105 and 110 contain the same equipment that was used to measure finished parts. Presently no activity is being performed in these boxes.

- Glovebox D115 at the present time is flanged off from the chainveyor and is not in use.
- Glovebox D125 has an ultrasonic cleaner in it that contained trichloroethane as the cleaning media to degrease the parts after inspection. Presently it is drained and out of service. This glovebox of the inspection module is the transfer point between Chainveyors S6, 13, 15 and 22. The east-end of Chainveyor S6 is the transfer point between it and Chainveyors S1, 9, 10 and 13.
- A common drain line runs the length of the module for the collection of waste coolant and solvents. This line goes to the C-Pit tank system via a below grade pipe way. Some connection to the drain line from E Module occurs below grade in D Module.

### SET 5 - Module E

Module E was where plutonium parts were assembled into pits. Presently ash repacking operations are being conducted in this module. Gloveboxes in the module are described below.

- Glovebox E20 was an inspection box that has a surface plate in it.
- Glovebox E25 was where parts were brushed before they were assembled into pits.
- Glovebox E30 was an inspection box where the welds of assembled pits were inspected using an eddy current inspection device.
- Gloveboxes E40, 45, 80 and 85 are all the same. These gloveboxes contain the E-Beam welding machines where parts were welded into pits.
- Glovebox Box E55 was the storage box for all the chucks, tooling and associated equipment used in the welding operations in Module E.
- Glovebox E60 was an inspection glovebox where the welded pits were leak tested.
- Glovebox E65 has an ultrasonic cleaner in it where parts were cleaned.
- Glovebox Box E70 was a multiple-use glovebox where the head of the E-Beam welder was cleaned, and the filament was inspected and changed. There was a tensile-strength tester for various parts.
- Glovebox E95 was where the pits were brushed after welding.
- Glovebox E105 was a dry-assembly box where parts were assembled before they were welded.
- Glovebox E110 was where parts were brushed. Box E115 was used as a storage box for the chainveyor birdcages.
- Glovebox E125 has an ultrasonic cleaner in it where parts were degreased.
- A common drain line runs the length of the module for the collection of solvents. This line goes to the C-Pit tank system via a below grade pipe way to V-100.
- A waste transfer line from G Module ties into the common drain line.
- With the exception of E40, E45, E80 and E85, all E Module gloveboxes are being used in support of Ash Processing under the RCRA permit.

### SET 6 - Module F

Module F was where the final assembly of the pits took place with the covering and welding shut the outer covering and inspection of the assembly. The module is divided into 5 rooms: 125, 125A&B, 126 and 127. Three of these rooms, 125 and 125A&B, were

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connected to the super-dry ventilation system. Rooms 125A&B were downdraft rooms where the assembled pits were covered with a shell to contain the plutonium to keep it from contaminating the atmosphere. In Room 125 the covering shell was welded shut in one of two Pigma welders and then pumped down and leak tested. In Room 126 the pits were put through a final inspection, pumped down, and baked out, and a gas sample was taken for analysis in the mass spectroscopy lab in Room 127 in this module. Rooms 125 and 126 are presently being used for storage of filled waste drums and staging of empty waste drums. The mass spectroscopy lab is being used to support gas analysis for various projects on plant site.

### SET 7 - Module G

Module G is divided into several rooms in which several operations were performed. The room numbers are: 130, 130 A&B, 131, 131A, 132, 132A, 133, 133A, 186 and 187. In Room 130 several different operations were performed on non-radioactive parts. Operations performed were cleaning, inspection, brazing and welding of parts with an Astro welding machine. There are two hooded lathes that were used to machine beryllium. Rooms 130A, 132 and 132A contained additional specialized inspection equipment such as optical comparators and sweep gages. Room 131 has three hooded vapor degreasers that used trichloroethane as the solvent. Room 131 A was used as a pressure testing room. The Standards Laboratory occupied Rooms 133 and 133A to calibrate and certify tool gages and instruments used in inspection and other operations performed in the building. Rooms 187 and 187A were the cold "hot" electric shops where repairs were made on electric equipment that had the potential to be contaminated with radioactive material, and are still in use. Room 130B contains a calorimeter to assay the amount of material contained in a waste package. This room opens only onto Corridor P. Also there is an unnumbered room opening only onto Corridor R in back of the electric shop, in which empty material movement carts were stored. Presently Rooms 133 and 133A have been stripped of the equipment in them and are being used to store drums. A Segmented Gamma Scan unit will be installed in these rooms.

A portion of room 130 was added to the RCRA permit in anticipation of the installation of a C Cell and drum crusher. This modification did not occur and the area was not used to store RCRA waste. Currently Rooms 130, 130A, 130B, 131, 132, 132A, 133 and 133A are included in the RCRA permit to allow for RCRA storage. Only rooms 133 and 133A are actively managing RCRA waste in conjunction with assay equipment that is installed in the rooms.

### SET 8 - Module H

Module H is divided into several rooms: 135, 135A through F, 136, 189, 190, and 191. The main operation conducted in Room 135 in the module was the high-pressure autoclaving of parts. The autoclaves in Rooms 135A through D operated using helium as the pressure gas. Beryllium parts were baked out in vacuum furnaces in Room 135. Autoclaves were not installed in Rooms 135E and F. Room 136 is the H Vault where parts were stored. Room 189 is used for chemical storage. Room 190 is the janitor

closet. Room 191 is the personal decontamination room where operators that were contaminated with radioactive material were decontaminated. There is a shower and a sink in this room. Presently Room 135 is used to store empty drums and the autoclave vaults are used to store drums containing high levels of radioactive material. The H Vault is used to store material.

#### SET 9 - Module J

Module J consists of three rooms: 140, 141 and 142. Room 140 was where parts were cast using bottom-pour and tilt-pour furnaces. Other operations conducted in this module were mold coating, crucible burnout, and skull oxidation. Gloveboxes J10, J20, J30, J40 and J50, were removed and glovebox J-30 was sent to Los Alamos. Glovebox J-40 was stripped of lead shielding and is currently in storage in crate, awaiting size reduction. Gloveboxes J10, J20 and J50 with lead shielding are located in Module B awaiting size reduction. The area in which these gloveboxes sat was to be occupied by the equipment to perform the operations needed for the PuSPS project. This project was not installed in the module but moved to Building 371. Remaining furnace gloveboxes are J15 (bottom-pour) and J25, J35, J45 and J55 (tilt-pour). Glovebox J60 was used for skull oxidation and crucible burnout. Glovebox J25 is being used to do oxide re-burn. Glovebox J65 is a drum bag-out glovebox. Rooms 141, the J Vault, and 142 are being used to store material.

Gloveboxes J35 and J55 were permitted for RCRA storage to manage cans of IDC H-61 that had been removed from the 707 ducting. Residue sampling indicated that this material exceeded RCRA limits for heavy metals and required management. Since these gloveboxes had active heat heads, they were permitted to store the material. Subsequently the material was repackaged and removed from the gloveboxes. Additionally the area was used to consolidate RCRA and non-RCRA sample returns from residue sampling.

J Vault is currently not storing any RCRA waste but remains subject to RCRA closure under the requirements of the Mixed Residue Consent Order.

The north side of J-Module was used for RCRA staging of material under the RCRA permit in associated with the permitted glovebox units in Modules J and K.

A common drain line runs the length of the module for the collection of organic waste. This line goes to the C-Pit tank system via a below grade pipe way to C-Pit. This line was not used and is not considered RCRA regulated.

#### SET 10 - Module K

Module K consists of two rooms: 145 and 146. Room 145 was where parts were cast using four tilt-pour furnaces, J55, J65, J75 and J85. There are two other gloveboxes in this room. Glovebox K45 is being used as an oxide can storage box, and K95 has a shear and a compactor in it to cut up and compact plutonium ingots for packaging into critically safe amounts for storage. Room 146 is the X-Y Retriever where material is stored in a critically safe configuration behind shielding.

A common drain line runs the length of the module for the collection of organic waste. This line goes to the C-Pit tank system via a below grade pipe way to C-Pit. This line was not used and is not considered RCRA regulated.

Gloveboxes K65 and K75 were permitted for RCRA storage to manage cans of IDC H-61 that had been removed from the 707 ducting. Residue sampling indicated that this material exceeded RCRA limits for heavy metals and required management. Since these gloveboxes had active heat heads, they were permitted to store the material. Subsequently the material was repackaged and removed from the gloveboxes.

### SET 11 - Second Floor

The second floor is the equipment room for Building 707. Equipment includes: (1) the heating, air conditioning, and ventilation, (HVAC), units, (2) the inerting system for the gloveboxes, (3) the electrical distribution panels for the equipment in the building, (4) the UPS electrical power system, (5) motor generators for the induction furnaces, (6) the control room for the ventilation and inert systems and (7) chemical makeup tanks. The floor is divided into three rooms for fire and possible contamination control.

The HVAC systems are still operating, as they are needed to maintain the necessary building negative atmosphere. The dehumidifiers have been drained of their lithium chloride, as there is no need to maintain a low humidity in the production area. There have been several spills of the lithium chloride solution near the Kathabar units. These units also leaked lithium chloride on the equipment and the floor. One spill or leak went through the floor and down onto equipment on the first floor. This solution is very corrosive so there is extensive corrosion on the equipment where it has leaked. The chillers associated with the dehumidification system have been drained of their Freon 12® and turned off.

The inerting system is still operational, as plutonium is still being handled and stored, and oxidation of the metal needs to be kept to a minimum. Module A needs to have an inert and dry atmosphere in the gloveboxes to keep the salts that are being stabilized in a dry and inert condition.

The electrical distribution panels are operational, as power is still needed to operate the equipment in the building. Electrical power to equipment that is not needed for current operations has been turned off at the distribution panels.

The UPS system is operational, as power is needed to the control room to operate the ventilation system controls until the emergency generator starts up and supplies the needed power.

The Health Physics vacuum system is operational, as the air-head sampling system needs to be in operation in the modules that have gloveboxes in them in case of a release of material

Pressure-reducing stations for steam, compressed air, and nitrogen are still in operation.

The cooling water systems that are still in operation are those needed to provide cooling to equipment still in use.

Chemical makeup tanks on the second floor were drained and are currently out of service.

### **SET 12 -- Contamination Area and Radiological Buffer Area Rooms**

Room 166 was a restroom and 164 was the pipe chase for the restroom. The rest room is no longer in use.

Room 170 was a janitor closet

Room 178 is a decontamination facility for personnel that become contaminated.

Rooms 149 and 176 are the airlocks that were the entry into the production area from the offices until the entry from 778 was made the only entry to the building. Presently they are secured emergency exits from the production area.

Radiography operations were performed in Rooms 167, 169, 171, 173, 175, 179 and 180. Rooms 167 and 169 were the radiography vaults and are presently being used to store radioactive waste drums. Room 173 was the darkroom. Room 171 was the control room for the X-ray units. Rooms 175, 179, and 180 were offices and film storage areas.

Rooms 181 and 182 were the offices and workshop for the electronic equipment development group. Presently all the equipment has been removed, shielding walls built and it is used to store high level waste drums.

Room 183 is a drum storage area.

Rooms 184, 184 A & B and 185 were where material for production of pits was received and assembled pits were packed for shipment. Presently it is used to pack stabilized oxide and plutonium metal for shipment from Room 185, the shipment dock airlock.

Room 188 was the tool crib and is no longer in use.

Rooms 195, 196, 196A and 197 were where supplies were received and waste drums shipped out. Room 196 had a segmented gamma counter for determining the amount of material in the waste drums. Room 197 is the dock airlock. Presently Room 196 is a RCRA-permitted area and the dock area is a receiving and shipping point for drums and supplies.

Room 152 is the entry stairwell to the second floor of the building.

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Room 192 is the secured emergency exit airlock and connects to Room 193, the southeast stairwell to the second floor, which is also secured. An elevator between the first and second floor is located adjacent to Room 193.

The following are RBA corridors: F, N to room 126, P, R and H east from Corridor D. All other corridors (G-M, S-V) are contamination area (CA). There are no corridors C, I, O or Q.

Portions of the ancillary piping associated with the RCRA regulated C-Pit tank system is located above the ceiling tiles in Corridors G, J, K, H and D. Additionally, below grade piping associated with the system is located below portions of Corridors J, K, L, M and G.

The portion of piping below grade in corridor T and U should not have been used and as such should not be regulated.

### SET 13 - Administrative Offices and Corridors A, B, D, & E

The function of the rooms that open onto Corridor E have been only offices and no laboratories in the rooms and they have not changed since the building was built. Only the groups occupying them might have changed.

There has been no modification to corridors A and E. Corridor B went from Corridor E to Corridor C which was a cold passageway on the east side of the tunnel from Building 778 when Building 707 was built. Presently it is being used as a storage room for filing cabinets that have records in them.

When the tunnel from B778 was built, Corridor D was an airlock corridor to the production areas and occupied the west side of the tunnel. During the security upgrade, Corridor C was eliminated, and Corridor D became the entrance and exit airlock to the production areas. Also eliminated were the airlocks from the production area to the administrative offices and they were secured and became emergency exits only.

## **2.3 Building 778**

### **2.3.1 Physical Description**

Building 778 is of the Butler-type construction with galvanized steel siding and roof. The original building was built in 1956-57 as part of the construction of Buildings 776 and 777. It housed the maintenance shops and the men's locker-shower facilities for those buildings. The laundry was added to the building in 1958 when all plutonium laundry operations were consolidated in one place. The walls are insulated with fiberglass batting and covered with gypsum board. The ceilings in the offices are drop-in acoustical tile and in the locker and shower rooms are gypsum board. Ceilings in the shops and the laundry are open to the insulation in the roof of the building. The size of the building at that time was 514 ft long and 50 ft wide and orientated in an east-west direction approximately 35 ft from Buildings 776 and 777. The east half of the building was the men's locker room and offices while the west half contained the maintenance

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shops and the laundry. Each half of the building has its own heating and ventilation system located in the overhead. In the late 70's or early 80's, an additional 80 ft was added to expand the men's locker room to allow for the building of a women's locker room at the northwest corner of the men's locker room. In the late 80's, an addition was built to the north side off the laundry to house a filter plenum for the air coming off the dryers for contamination control purposes. There are two passageways leading into Buildings 776 and 777 and two leading to Building 707. When originally constructed there was only one passageway to Building 707, the west one. It contained two corridors, Corridor C that led to Corridor B that went to the offices and Corridor D that led to the airlock entrance to the production area. When the enhanced security post was constructed Corridor C was eliminated and Corridor B was sealed off and Corridor D became a one way in and one way out of the production area. A second passageway was built to the east that connected Door 13 in 778 to Door 20 in B707.

### 2.3.2 Historical Processes

There were never any production processes performed in Building 778. It was only used to support operations in Buildings 776, 777 and 707 by the maintenance department and house the locker facilities for those buildings. By 1976 all laundry operations for the Plant Site were consolidated in the building. All laundry operations were moved out of the building to Building 556 in 1991.

Water from the washers in the laundry flowed to a sump, where it was pumped to Building 774 for processing. When Building 374 started operations, it was pumped to that building via Valve Pit 9. Surges of water went to a tank in Building 732, the laundry pit from where it can be pumped to B374 via Valve Pit 9.

There are two process waste lines that come into Building 778 from Building 776 through the west passageway. The lines proceed overhead down the main hallway to the laundry, overhead along the east wall of the laundry to a pit, where they drop below floor level in the southeast corner and go out through the foundation wall to Valve Vault 9. These lines come from Building 774 allowing that building to make transfers to 374. The laundry wastewater has a "Y" connection in one of these lines to make its transfer of wastewater to Building 374.

As the laundry washed clothes from the beryllium machining shop there is the possibility of Be contamination in the washers and dryers. There have been spills of the wash water around the washers. If there was contamination released to the floor from spills it was decontaminated and any residual contamination has since been covered up by paint. The transfer lines from Building 774 are not contained lines and have flanges on them. When transfers were made from Building 774 to Building 374 the transfer lines were walked down to see if there were leaks at the flanges. In the shops there have been spills of cutting oils and lubrication oils and greases.

Overhead in the west tunnel, off of Building 707 Corridor D, is a chainveyor, S8, that allowed for the transfer of material from the Building 777 production area to the production lines in Building 707. Also there is piping that supported the transfer of

organic waste to Building 774 via Building 777 from the C-Pit tank system in the overhead.

### **2.3.3 Current Status**

Currently the building supports D&D efforts in Buildings 776, 777 and 707. The laundry no longer does the washing of work-related clothes but is a storage place for clean clothes before they are taken to the locker rooms and for dirty clothes to be shipped of site to be laundered.

## **2.4 Building T707S - Oil Storage Shed**

Building T707S was used to store the machining oil and cutting fluid used in production operations. Maintenance also stored their lubrication oils and greases there. In addition, used oils were stored in the shed, and used oils were blended for other uses. No contaminated oils were ever stored there. Presently the shed is used for equipment storage.

The building is constructed of metal panels and a metal roof with a wood floor. There have been spills and leaks as evidenced by staining of wood floor.

## **2.5 Building 708 - Air Compressor and Emergency Generator Building**

Building 708 was built as part of the Building 707 construction project and is of the same type of construction, vertical twin-tee walls and twin-tee roof construction, as Building 707. The control room for 708 is on the west side of the building and is constructed of steel studs and gypsum board. There are two separate electric powered compressed air systems that supply air to the building. Both are dedicated to a specific use. One supplies air to production via a pressure-reducing station and equipment on the second floor HVAC equipment. The other supplies purified air to the breathing air system for the 700 area complex of buildings. Both systems have back-up compressors in case of an emergency or maintenance shut down. In the case of the breathing air system, there is an additional back-up system in that there is a skid mounted electrical powered compressor outside the building that can supply breathing air on a limited basis.

The building also houses chillers that supply ethylene glycol water solution (brine) to certain closed loop cooling systems in Building 707 to remove the heat from the exchangers in these systems. The refrigerant used to chill the brine is Freon 11<sup>®</sup>. There are three chillers in the building; only two are operational at this time. The third unit has been drained of its refrigerant and is used to supply spare parts for the other units. There was a large spill of refrigerant from one of the units. Some of the spilled material was recycled, and some that could not be recycled was stored in a RCRA area in the building.

In addition the building houses a diesel powered emergency generator, this generator supplies enough electrical power to building 707 to operate the ventilation systems to have a minimal airflow such that contamination control is maintained during a power

outage. Only systems that are essential to the safety to the workers and to the public are operational on emergency power. There is a second diesel powered generator that is used to supply power to an air compressor so that there will be compressed air to operate the control valves on the ventilation systems. No major reportable leaks or spills of diesel fuel have occurred with these generators. Minor spills were picked up and the absorbent disposed off properly.

## **2.6 Buildings 711, 711A and 718 – Cooling Tower, Cooling Tower Emergency Diesel Pump, and Cooling Tower Pump House**

This complex located southwest of Building 707 supplies tower water to Buildings 750, 707 and 708 for cooling various systems in these buildings. In Building 707 it goes to heat exchangers in closed loop cooling systems. In Building 708 it goes to heat exchangers on the air compressors (breathing and plant air), the emergency generators and the chillers

The cooling tower is a three-cell induced-draft cross-flow cooling tower, with each cell equipped with a two-speed centrally mounted reversible fan and was constructed in 1982. Three parallel pumps draw water from the tower basin through screened channels. Normal operation calls for one pump to be operating and one pump to be on standby. Two of the pumps are electrically driven, while the third is driven by a diesel engine. The diesel driven pump is the backup circulating pump. Diesel fuel is supplied from a nearby 1000-gallon tank by a continuously operating pump to the engine tank. The diesel pump will start when a low-pressure signal on the common discharge header is received, or it can be manually started through local controls. All pumps are mounted on a concrete pad (B711A) set between the cooling tower and Building 718. The diesel tank is also situated on the pad. The Building 711 cooling tower has a dry-type water deluge system with heat sensors on the tower. When heat is detected by the sensors a signal is sent to the pneumatically operated deluge valve located in Building 718.

Building 718 houses the wet-cell batteries to start the diesel engine. An automatic battery charger ensures that the batteries are kept fully charged. Building 711 has its own ten-inch firewater feeder.

There has been no release of diesel fuel to the environment from B711A. The minor spills caused by maintenance were cleaned up, and the pick-up material were disposed of properly.

There are two underground storage tanks in the area that previously supplied diesel to the complex (Tanks 324 and 325). These tanks were emptied and foamed. Any needed soil remediation will be determined and implemented as necessary in the future.

## **2.7 Building 731 – Plenum Deluge/Process Waste Pit**

Building 731 was part of the 707 construction project and is located underground in the courtyard east of Building 707. It consists of a concrete vault that houses two 1,650-gallon fiberglass tanks and two associated electric-powered transfer pumps. The tanks

were retired as RCRA 90 day tanks and underwent RCRA closure in 1995. Access is gained via a covered stairwell with a locked door at the entrance to the stairwell. The process waste tanks collect and store aqueous process wastes and eventually send them to Building 374 for treatment. The aqueous wastes collected include chiller condensate; emergency eye wash/shower wastewater; deactivation, decommissioning and decontamination wastewater, and janitorial sink and floor drains wastewater that could be contaminated with plutonium and americium. Process waste solutions drain to its tank in the pit where it is sampled for radioactivity and sent to Building 374 for processing. In case of a fire in any of the ventilation systems in the production area of Building 707 when the temperature rises above a set point in the heat absorption chamber the fire suppression system will activate. The water from this suppression system would drain through a drainpipe to a tank in the B731 pit; there the stored water would be sampled for radioactivity and sent to Building 374 for processing.

An inactive Raschig Ring tank, T-101 that used to be part of the plenum deluge system is also located in the B731 pit.

## **2.8 Building 732 – B778 Laundry Tank and Pump Vault**

Building 732 was constructed in the mid-1980s. Equipment in this building consists of Tank T-4 (RCRA Unit # 40.16), an 800-gallon capacity storage tank, two 45-gpm pumps, and two banks of canister-type filters. The tank was used as a surge tank for laundry wastewater, which was pumped to Building 374 via valve pit 9. In the early 1990s, after B778 no longer generated laundry wastewater, the B732 systems were tied into B776 in order to handle deluge water from the Zone 2 plenums. However, no B776 Zone 2 deluge water was ever generated and conveyed to B732 since the tie-in.

## **2.9 Building 707 Tanks**

Tanks that support Building 707 contain carbon tetrachloride, diesel fuel, argon, nitrogen, and helium. These support tanks are designated and described as follows:

- Facility Tank 206 (Building 707 Tank D-2) is the carbon tetrachloride storage tank and is located north of Building 707 in a 5 ft high bermed area. This tank, a vertical dished head tank, which has a center drain in the bottom, has been drained of all liquid. The tank has not been flushed. No leaks or spills have occurred in the bermed area of the Tank D-2.
- Facility Tank 208 is the liquid argon storage tank and is located at the southwest corner of the building.
- Facility Tanks 209-212 are helium storage tanks and listed as a group (Building 707 Tank V-41 designation). They are located south of the building.
- Facility Tanks 213-216 are helium storage tanks and listed as a group (Building 707 Tank V-42 designation). They are located south of the building.
- Facility Tanks 217-221 are helium storage tanks and listed as a group (Building 707 Tank V-40 designation). They are located south of the building.

- Tank 223 is the liquid nitrogen storage tank and is located at the southeast corner of the building.
- Facility Tanks 324 and 325 are diesel fuel storage tanks that support the diesel-driven pump at the 711 cooling tower and are located south of Building 718.
- Facility Tank TK-16 is an aboveground storage tank for diesel fuel. This tank supplies fuel to the diesel engines in Building 708.
- Facility Tank 284 is a helium storage tank located south of Building 707. This tank is empty and is not being used.
- Facility Tank 290 (UST 16) is a Diesel Blend storage tank located northwest of Cooling Tower 709 in the Building 707 Cluster Complex.

Neither of the diesel fuel tanks are bermed as they both are approved double walled storage tanks.

## **2.10 Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern (PAC), and Under Building Contamination (UBC) Sites**

There are five IHSSs, three PACs, and three UBCs in and around the B707 Cluster. The IHSSs include 118.2, 150.7, 150.4, 123.2, and 159. IHSS 118.2 concerns the area around the bermed carbon tetrachloride tank north of Building 707. There were several spills of carbon tetrachloride in this area, which may have leaked into the ground. IHSS 150.7 includes the area between Buildings 776/777 and Building 707 that may have had chemical spills. IHSS 150.4 was a hydraulic oil spill from a forklift truck that may have contained PCBs. IHSS 123.2 is where there were leaks in the original waste transfer line. IHSS 159 was created from the fire in Building 776. Contamination was carried out of the building and contaminated the road that runs past Building 778.

Potential Areas of Concern are 700-1115, 700-1103 and 700-1101. 700-1115 is a diesel fuel oil plume from leaking supply and return lines associated with the underground storage tank that supplied diesel to Building 708. 700-1103 is an area that had a PCB spill from an electric transformer that sits on top of the radiographic vault. This spill was cleaned up at the time of the spill and should not be of concern at this time. PAC 700-1101 is from when the tank in Building 732 overflowed and filled up the vault with laundry water and flowed out onto the ground.

The three UBCs are associated with Buildings 707, 778 and 731. The UBC 707 is the area where waste transfer lines run under the building. One line runs from Building 731 to valve vault 9, and the other line is the original waste transfer line from the south side the plant. There could also be contamination carried beneath the building through cracks in the concrete floors by spill of contaminated carbon tetrachloride oil. UBC 778 is at each end of Building 778 where waste process transfer lines run under the building. UBC 731 is from spills in Building 731.

### **3.0 SUMMARY OF CHARACTERIZATION ACTIVITIES**

This section discusses the B707 characterization activities performed, including analysis of historical data and process knowledge and conduct of RLC. Section 3.1 presents the data quality objectives used to assess data and process knowledge, identify data gaps, and determine sampling and quality requirements. Section 3.2 presents historical radiological data and process knowledge, and radiological RLC characterization activities performed. Section 3.3 presents historical chemical data and process knowledge, and chemical RLC characterization activities performed.

#### **3.1 Data Quality Objectives (DQOs)**

##### **The Problem**

Some contaminants may be present within the B707 Cluster, but the actual location of contaminants, their concentrations, and the associated quantities of contaminated media are unknown relative to the requirements associated with the D&D program. Determination of the types and quantities of radiological and chemical contamination, and the associated consequent waste streams are required to 1) confirm or revise the facility typing; 2) identify decommissioning approaches and technologies; 3) develop worker health and safety controls; 4) develop waste management and material disposition options; and 5) provide input to the design of in-process and pre-demolition survey characterization. Based upon historical and process knowledge of the buildings, the potential contaminants of concern include radionuclides, RCRA metals (specifically chromium and lead), beryllium, asbestos, and polychlorinated biphenyls (PCBs).

##### **The Decisions**

The critical technical decisions for the project are as follows:

- What floors, walls (interior and exterior), ceilings, roofs, equipment, and/or other media (e.g., liquids in equipment) are radiologically and/or chemically contaminated?
- What are the radiological and chemical waste streams that will result from D&D, and what are the associated volumes?
- Are the hazards consistent with the preliminary facility typing?
- How much, if any, additional characterization will be needed during in-process characterization?

##### **Inputs to the Decisions**

Inputs are quantitative data produced from the radiological survey of surfaces for removable and total contamination, and paint, building material, and surface smear samples for radiological and chemical contamination. Historical data and process knowledge were also reviewed for use. In addition, unrestricted release criteria and waste management regulations were used (see Decision Rules below).

## **Decision Boundaries**

All facilities and all materials and equipment contained therein were considered as within the project boundaries. Environmental media were not considered within the project boundaries.

## **Decision Rules**

Radiological and chemical decision rules are based on the premise that the Reconnaissance Level Characterization is an initial characterization for material disposition (i.e., reuse, recycling or disposal) purposes.

### **Radionuclides**

1. If all radiological survey and scan measurements are below the surface contamination guidelines provided in DOE Order 5400.5 (Radiation Protection of the Public and Environment), and if all radiological sample measurements are below the volume contamination thresholds provided in the No-Rad-Added Verification (NRA) Program (refer to Kaiser-Hill letter to DOE, RFFO, Application of Surface Contamination Guidelines from Department of Energy Order 5400.5 – WAH-064-98, March 10, 1998), the related surface and/or volume are classified as not radiologically contaminated.
2. If any radiological survey or scan measurement exceeds the surface contamination guidelines provided in DOE Order 5400.5, the related surface is classified as radiologically contaminated.
3. If any radiological sample measurement exceeds the volume contamination thresholds provided in the NRA Verification Program (refer to Kaiser-Hill letter to DOE, RFFO, Application of Surface Contamination Guidelines from Department of Energy Order 5400.5 – WAH-064-98, March 10, 1998), the related volume is classified as radiologically contaminated.

### **Hazardous Waste**

If decommissioning waste is mixed with or contains a listed hazardous waste, or if the waste exhibits a characteristic of a hazardous waste, then the waste is classified as hazardous waste in accordance with 6 CCR 1007-3, Parts 261 and 268.

### **Hazardous Substances**

If material contains a listed hazardous substance above the CERCLA reportable quantity (40 CFR 302.4), the material is subject to CERCLA regulation (i.e., remediation and/or notification requirements).

### **Beryllium**

If surface concentrations of beryllium are equal to or greater than  $0.2 \mu\text{g}/100 \text{ cm}^2$ , the material is considered beryllium contaminated per the Occupational Safety and

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## Industrial Hygiene Program Manual, Chapter 28, Chronic Beryllium Disease Prevention Program (CBDPP).

### PCBs

- If material contains PCBs from the manufacturing process, the material is classified as PCB Bulk Product Waste and subject to the requirements of 40 CFR 761.
- If PCB contamination from a past spill/release is suspected, or if a PCB spill is discovered that has not been cleaned up, the associated material is classified as PCB Remediation Waste and subject to the requirements of 40 CFR 761, the RFETS Polychlorinated Biphenyls Management Plan (PRO-673-EWQA-1.5), and the WSRIC standards.
- If a waste or item contains PCBs in regulated concentrations, the waste or item is considered PCB-regulated material and subject to the requirements of 40 CFR 761.

### Asbestos

If any one sample of a sample set representing a homogeneous medium results in a positive detection (i.e., >1% by volume), then the material is considered asbestos containing material (ACM; 40 CFR 763 and 5 CCR 1001-10).

### **Tolerable Limits on Decision Error**

Sampling design error for radiological sampling was controlled by requiring a minimum number of uniformly distributed ( $n=30$ ) and biased surveys ( $n=10$ ) to be performed in each survey area. Survey area size limits are based upon the requirements of Table 1 of PRO-475-RSP-16.01. Survey areas were developed based on current radiological postings, the procedurally driven size limitations, function and use of area, and where possible, maintaining contiguous survey areas.

A 95% confidence limit was used for hazardous waste, hazardous substance, beryllium, and PCB characterization. Decision error does not apply to asbestos sample sets per 40 CFR 763. Results are compared with the action levels on a sample-by-sample basis.

### **Optimization of Design**

Radionuclide characterization was performed in a subjective manner to initially classify areas for material disposition (i.e., reuse, recycling or disposal) purposes. Radionuclide sampling and analysis were not optimized to include pre-demolition survey criteria based on the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM, NUREG-1575). Radiological field measurements, sampling, and preparation for laboratory analyses were performed in accordance with approved RFETS site procedures, including Appendix D of the RFETS Decontamination and Decommissioning Characterization Protocol (MAN-077-DDCP).

Chemical characterization was performed in accordance with Section 6.0 and Appendix D of the RFETS Decontamination and Decommissioning Characterization Protocol (MAN-077-DDCP).

### 3.2 Radiological Characterization

Radiological characterization was performed to understand the nature and extent of radioactive materials that may be present in the B707 Cluster, and to confirm or revise the preliminary facility classifications. This section discusses historical radiological data and process knowledge and discusses RLC conducted. Radiological hazards and RLC data are discussed in Section 4.0. Historical and RLC radiological data are presented in Appendices A – J, including survey/scan and laboratory data. Appendices present documentation on sample chain-of-custody, sample locations, and laboratory results.

RLC was conducted and recorded by survey area (see Appendices). The findings for the B707 interior are summarized in Section 4.0 by survey area and SET. The findings for the B707 exterior and other B707 structures are summarized by survey area. Survey areas are described in Table 3-1 below.

Table 3-1. B707 Cluster RLC Survey Areas.

BUILDING	SURVEY AREA	SET	SURVEY AREA DESCRIPTION
Package ID: 99-0002			
707	A	11	NE CORNER OF ROOM 200, B707, 2 <sup>ND</sup> FLOOR
707	B	11	NW CORNER OF ROOM 200, B707, 2 <sup>ND</sup> FLOOR
707	C	11	SE CORNER OF ROOM 200, B707, 2 <sup>ND</sup> FLOOR
707	D	11	SW CORNER OF ROOM 200, B707, 2 <sup>ND</sup> FLOOR
707	E	11	EAST HALF OF ROOM 210, B707, 2 <sup>ND</sup> FLOOR
707	F	11	WEST HALF OF ROOM 210, B707, 2 <sup>ND</sup> FLOOR
707	G	11	NE CORNER OF ROOM 220, B707, 2 <sup>ND</sup> FLOOR
707	H	11	NW CORNER OF ROOM 220, B707, 2 <sup>ND</sup> FLOOR
707	I	11	SE CORNER OF ROOM 220, B707, 2 <sup>ND</sup> FLOOR
707	J	11	SW CORNER OF ROOM 220, B707, 2 <sup>ND</sup> FLOOR
707	K	11	NORTHERN PORTION OF ROOM 240, B707, 2 <sup>ND</sup> FLOOR
707	L	11	SOUTHERN PORTION OF ROOM 240, B707, 2 <sup>ND</sup> FLOOR
707	M	1	MODULE A (ROOM 100), B707, MAIN FLOOR
707	N	2	MODULE B (ROOM 105), B707, MAIN FLOOR
707	O	3	MODULE C (ROOM 110), B707, MAIN FLOOR
707	P	4	MODULE D (ROOM 115), B707, MAIN FLOOR
707	Q	5	MODULE E (ROOM 120), B707, MAIN FLOOR
707	R	6	MODULE F, B707 MAIN FLOOR. (EXCLUDES ROOMS 125A, 125B)
707	S	7	MODULE G, B707, MAIN FLOOR
707	T	8	MODULE H, B707, MAIN FLOOR

BUILDING	SURVEY AREA	SET	SURVEY AREA DESCRIPTION
707	U	12	RBA ROOMS 167, 169, 171, 173, 175, 179, 180, 181, 182, 183, 184, 185, 188, 192, 193, 194, 195, 196 & 197, B707 MAIN FLOOR
707	V	12	CORRIDORS H, J, K, L, S, T, U, V. NORTH ENDS OF CORRIDORS F AND G FROM THE NE CORNER AND NW CORNER OF MODULE D, RESPECTIVELY, TO CORRIDOR H. ROOMS 164, 166, 170 OF B707 MAIN FLOOR
707	W	12	CORRIDORS M, N, P, R AND THE SOUTH ENDS OF CORRIDORS F AND G FROM THE NE CORNER AND NW CORNER OF MODULE D, RESPECTIVELY, EXTENDING TO THE SOUTH END OF B707. INCLUDES ROOMS 178 AND 178A.
707	X	9 & 10	MODULES J AND K, OF B707, EXCLUDING ROOMS 146, 141, and 142
707	Y	13	NON-RADIOLOGICAL ROOMS: 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 172, 174, 176, AND CORRIDORS. EXCLUDING ROOMS 164, 166, 170, 178 AND 178A OF B707.
707	Z	16	EXTERNAL SURFACES/ROOF OF B707 (including roof sections 1, 2 and 3)
708	AA	15	INTERIOR OF B708
708	BB	15	EXTERNAL SURFACES/ROOF OF B708
731	CC	17	INSIDE OF BUILDING 731
707 EXTERIOR TANKS	DD	14	TANKS: T-223 (LIQUID NITROGEN), T-16 (DIESEL), T209 THROUGH T221 AND T-284 (HELIUM), T-208 (LIQUID ARGON), T-206 (CARBON TETRACHLORIDE), T-16 (DIESEL), T-290 (DIESEL), T-324 (DIESEL), T-325 (DIESEL)
711, 711A, 718	EE	15	BLDGS 711 (COOLING TOWER), 711A (EMERGENCY DIESEL PUMP FOR COOLING TOWER), 718 (COOLING TOWER SERVICE BUILDING)
711	FF	15	ROOF/EXTERIOR OF B711 (COOLING TOWER)
718	GG	15	ROOF/EXTERIOR OF B718
731	JJ	17	ROOF/EXTERIOR OF B731
Package ID: 2000-0002			
B778	A**	17	INTERIOR OF 778 - EAST PORTION OF BUILDING 778. EAST END OF BUILDING EXTENDING TO COLUMN 8.
B778	B**	17	INTERIOR OF 778 - WEST PORTION OF BUILDING 778 EXTENDING FROM COLUMN 8 WEST TO COLUMN 7W.
B778	C**	17	INTERIOR OF 778 - POSTED CA. COLUMN 7W TO WEST END OF BUILDING.
B778	D**	17	ROOF/EXTERIOR OF 778
B732	E**	17	INTERIOR OF 732
B732	F**	17	EXTERIOR OF 732
T707S	G**	17	INTERIOR OF T707S (OIL STORAGE SHED)
T707S	H**	17	ROOF/EXTERIOR OF T707S

\*\* Although survey areas in the second survey package have the same letter designator as those for Building 707, they are different survey areas. Per RSP-16.01, survey areas are identified by both a package ID# and survey area "letter" designator (A, B, C, etc.). Since survey packages for 778, T707S and 732 were developed in CY2000, they are under Package ID # 2000-0002 and therefore have some redundant survey area designators (e.g., A, B, C) with those developed in CY1999. Survey packages developed in CY1999 were developed under Package ID# 99-0002.

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### 3.2.1 Summary of Historical Data

The availability of routine radiological surveys is generally dependent upon the function of the facility, current radiological conditions, postings for the area, and Radiological Control Manual requirements. Table 3-2 summarizes those areas/structures in the Building 707 complex where historical radiological surveys are obtained on a routine basis.

**Table 3-2 Summary of Available Historical Radiological Survey Data.**

Building	Routine Radiological Surveys Taken?	Historical Data Summarized in Table(s):
707	Yes	3-3
708	Yes	3-4
731	Yes	3-5
778	Yes	3-6
732	No	NA
707 Cluster Exterior Tanks	No	NA
T707S	No	NA
711, 711A, 718	No	NA

NA = not available

Routine radiological surveys were reviewed for a three-month period in 1999. Frequent archiving of survey data makes older data inaccessible for review. The survey types and results are summarized by building in Tables 3-3 through 3-6. Where possible, results are compared with the surface contamination limits prescribed in DOE Order 5400.5, "Radiation Protection of the Public and the Environment". Note that the grouping of historical routine surveys are typically based on radiological postings that do not necessarily coincide with survey area designations specified for RLC. However, attempts have been made to correlate the historical survey data with the RLC survey areas. Additionally, surveys for different survey areas may be conducted at different frequencies depending upon the radiological postings and radiological safety program requirements. Actual historical radiological surveys for the areas where survey data are available are presented in the Appendixes.

#### Building 707 General Radiological Conditions

All of the Building 707 radiological areas beyond the main step-off pad are posted as a Fixed Contamination Area (FCA). Within the FCA are Radiological Buffer Areas (RBAs), Contamination Areas (CAs), High Contamination Areas (HCAs), and Airborne Radioactivity Areas (ARAs). As summarized in Tables 3-3 through 3-6 below, the routine radiological surveys indicate that contamination is being maintained within the specified posting criteria, with only a few exceptions. Where survey instrumentation and methodology meet the criteria of DOE 5400.5, most of the routine survey results for removable alpha are below the release criteria specified in DOE 5400.5.

## **1<sup>st</sup> Floor**

All modules within Building 707 have had a history of contamination and/or airborne radioactivity releases. Modules A, B, C, J and K have historically had the most significant contamination release events as these modules have been associated with the primary historical production mission for Building 707. These modules are also periodically posted as airborne radioactivity areas due to bag-out activities taking place in the rooms. The airborne radioactivity area posting for these areas are generally downgraded after such activities have been completed. During RLC, Modules A through E, and G, J, and K were posted as CAs. Modules F and H were posted as RBAs, however, there are radiation areas within both, and Module F includes a CA, a HCA, and an ARA.

Corridors that surround the modules are posted as either RBAs or CAs depending upon access needs. In general, Corridor F and portions of Corridor N and R are RBAs, while the remaining corridors are CAs. Rooms east of Corridor F are currently used for cal-gamma operations and material storage and are posted as RBAs, with the exception of Room 188, which is a CA, and a small CA within Room 167. Historically these rooms did not have significant levels of contamination and were utilized for support activities rather than direct processes.

## **2<sup>nd</sup> Floor**

Releases of radiological contamination have occurred in the past on the second floor of Building 707. These have generally been tied with work activities associated with the various filter plenum and ventilation systems. The entire 2<sup>nd</sup> floor is posted as an RBA. Throughout the 2<sup>nd</sup> floor there are areas with equipment on the walls, floors, and in the overheads that are labeled as internally contaminated.

## **Building 708**

Building 708 is considered a non-radiological facility with the exception of a small posted Radioactive Material Area (RMA) at the center of the building. No historical releases have occurred in Building 708. The systems within Building 708 support the heating and cooling of Building 707 and provide air for supplied air operations. These systems are closed loop systems, and therefore, potential for contamination is minimal. Routine radiological surveys do not indicate removable alpha contamination above DOE Order 5400.5 criteria.

## **Buildings 711, 711A, 718**

Buildings 711, 711A and 718 are not radiologically posted facilities. No known historical radiological releases have occurred in this facility. No radiological survey data are available for these facilities.

### **Building 778**

Building 778 contains both radiological and non-radiological areas. The far west end of the building (Room 100) was the former laundry facility for contaminated clothing and respirators from across the site. The far west end of Room 100 is posted as a CA and contains multiple pieces of equipment that may be radiologically contaminated.

Adjacent to the posted CA is a posted radioactive material area (RMA), which contains potentially contaminated anti-contamination clothing that has been used in the radiological areas of Building 707. The RMA serves as a staging area for anti-contamination clothing prior to shipment out of the building. Routine radiological surveys do not indicate removable alpha contamination above DOE Order 5400.5 criteria.

The middle section and east end of the facility contain various (non-radiological) maintenance shops, offices, breakrooms, and locker rooms. No significant releases have occurred in these areas. Routine radiological surveys for this portion of the building do not indicate removable alpha contamination above DOE Order 5400.5 criteria.

### **Building 731**

Building 731 is currently posted as a FCA and an ARA. Building 731 is part of the plenum deluge system containing holding water tanks, piping and pumps. Historically, Building 731 has had releases/overflow spills from piping and tanks, which has resulted in the contamination of surfaces within the structure. Routine radiological surveys indicate the majority of removable alpha contamination is below the DOE Order 5400.5 release criteria, but there were three points during the period reviewed that exceeded the release threshold.

### **Building 732**

Building 732 is currently posted as a FCA. Building 732 contains a tank and piping associated with the B778 laundry facility. Overflows from piping and tanks in the room have occurred in the past resulting in contamination of surfaces within the structure. Additionally, the floors have been painted numerous times due to the presence of contamination. This area has not been routinely surveyed for several years, and no radiological survey data are available.

### **Building T707S**

Building T707S is not a radiologically posted facility. No known historical radiological releases have occurred in this structure. No radiological survey data are available for this area.

## Exterior Tanks

The tanks exterior to Building 707 proper are not radiologically posted facilities/structures. No known historical radiological releases have occurred or been associated with these tanks. Radiological survey data are not available for these tanks.

**Table 3-3 Types and Results of Historical Radiological Surveys for Building 707. (Surveys are for the period 7/99 – 9/99 unless otherwise indicated.)**

Location/Area Surveyed	Cross-Reference to RLC Survey Area(s):	Approximate Number of Survey Points Taken per Specified Survey Frequency (total points reviewed in parenthesis)	Number Of Survey Points Above Surface Contamination Release Criteria?
Non-rad. office areas	Y	26 annually <sup>a,e</sup> (26)	NONE
Main Step-Off Pad, Dress out areas in Corridors F and H	V	40 shiftly <sup>a,e</sup> (1439)	NONE
1 <sup>st</sup> floor partial corridors H, F, N, Q; Module F; Module G (partial); Module H	Portions of V, W, R, S, T	34 weekly <sup>a</sup> (442)	NONE
CA corridors on 1 <sup>st</sup> floor (floors)	Portions of V, W	35 weekly <sup>a</sup> (490)	NONE
Module A (floors)	M	30 weekly <sup>b</sup> (360)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module A (overheads)	M	70 annually <sup>b,f</sup> (70)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module B (floors)	N	30 weekly <sup>b</sup> (360)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module B (overheads)	N	70 annually <sup>b,f</sup> (70)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module C (floors)	O	35 weekly <sup>b</sup> (419)	INDETERMINANT <sup>c</sup> • 2 pts. = 500 dpm; • all others <250 dpm
Module C (overheads)	O	79 annually <sup>b,f</sup> (79)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module D (floors)	P	30 weekly <sup>b</sup> (356)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module D (overheads)	P	70 annually <sup>b,f</sup> (70)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module E (floors)	Q	30 weekly <sup>b</sup> (360)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module E (overheads)	Q	70 annually <sup>b,e</sup> (70)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module F (floors)	R	30 weekly <sup>a</sup> (359)	NONE
Module F (overheads)	R	60 annually <sup>b,g</sup> (60)	INDETERMINANT <sup>c</sup> (all values <94 dpm)
Module G (RBA)	S	6 weekly <sup>a</sup>	NONE

Location/Area Surveyed	Cross-Reference to RLC Survey Area(s):	Approximate Number of Survey Points Taken per Specified Survey Frequency (total points reviewed in parenthesis)	Number Of Survey Points Above Surface Contamination Release Criteria?
(floors)		(72)	
Module G (overheads)	S	71 annually <sup>b, e</sup> (71)	INDETERMINANT <sup>c</sup> <ul style="list-style-type: none"><li>• 62 pts. &lt;250 dpm</li><li>• 9 pts. &lt;94 dpm</li></ul>
Module G (CA) (floors)	S	30 weekly <sup>b</sup> (288)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module H (floors)	T	25 weekly <sup>a</sup> (300)	NONE
Module H (overheads)	T	65 annually <sup>b, g</sup> (55)	INDETERMINANT <sup>c</sup> (all values <94 dpm)
H Vault (module H) (floors)	T	8 weekly <sup>a</sup> (88)	NONE
Module J (floors)	X	20 weekly <sup>b</sup> (240)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module J (overheads)	X	35 annually <sup>b, h</sup> (35)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
J Vault (module J) (floors)	X	10 weekly <sup>b</sup> (110)	INDETERMINANT <sup>c</sup> (all values <250 dpm) <sup>d</sup>
Module K (floors)	X	20 weekly <sup>b</sup> (240)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
Module K (overheads)	X	35 annually <sup>b, h</sup> (35)	INDETERMINANT <sup>c</sup> (all values <250 dpm)
1 <sup>st</sup> floor NDT/Offices/Shipping (RBA)	U	31 weekly <sup>b</sup> (372)	NONE
2 <sup>nd</sup> floor RBA	A through L (inclusive)	18 weekly <sup>a</sup> (234)	NONE
Exterior of Building 707	N/A	Not Routinely Surveyed	NA

a. Only removable alpha 100cm<sup>2</sup> swipe surveys are performed at each location.

b. Only large area wipes for removable alpha contamination are performed for this survey.

c. Surveys routinely taken in these areas consist of large area wipes (>100 cm<sup>2</sup>). Large area wipe techniques and instrumentation do not meet the release criteria of DOE 5400.5 and therefore comparison with release criteria of 5400.5 is not possible. Data provided for general information only.

d. Large area wipe survey values vary due to MDA of instrumentation used.

e. Survey dated 5/21/99

f. Survey dated 5/23/99

g. Survey dated 5/2/99

h. Survey dated 6/1/99

**Table 3-4 Types and Results of Historical Radiological Surveys for Building 708. (Surveys are for the period 7/99 – 9/99 unless otherwise indicated.)**

Location/Area Surveyed	Cross-Reference to RLC Survey Area(s):	Approximate Number of Survey Points Taken per Specified Survey Frequency (total points reviewed in parenthesis)	Number Of Survey Points Above Surface Contamination Release Criteria?
Building 708 Main floor interior	AA	15 <sup>a</sup> weekly (195)	NONE
Building 708 exterior	BB	Not Routinely Surveyed	NA

a. Only removable alpha 100cm<sup>2</sup> swipe surveys are performed at each location.

**Table 3-5 Types and Results of Historical Radiological Surveys for Building 731. (Surveys are for the period 7/99 – 9/99 unless otherwise indicated.)**

Location/Area Surveyed	Cross-Reference to RLC Survey Area(s):	Approximate Number of Survey Points Taken per Specified Survey Frequency (total reviewed points in parenthesis)	Number Of Survey Points Above Surface Contamination Release Criteria?
Building 731 Interior floors	CC	25 <sup>a</sup> weekly (300)	3
Building 731 exterior	HH	Not Routinely Surveyed	NA

a. Only removable alpha 100cm<sup>2</sup> swipe surveys are performed at each location.

**Table 3-6 Types and Results of Historical Radiological Surveys for Building 778. (Surveys are for the period 7/99 – 9/99 unless otherwise indicated.)**

Location/Area surveyed	Cross-Reference to RLC Survey Area(s):	Approximate Number of Survey Points Taken per Specified Survey Frequency (total points reviewed in parenthesis)	Number Of Survey Points Above Surface Contamination Release Criteria?
Building 778 (men's locker room)	A**	81 <sup>a</sup> weekly (1134)	NONE
Building 778 (women's locker room)	A**	30 <sup>a</sup> weekly (420)	NONE
Building 778 Maintenance East	B**	20 <sup>a,b</sup> annually (20)	NONE
Building 778 Maintenance West	B**	20 <sup>a,b</sup> annually (20)	NONE
Building 778 Shift Mgrs. Office Area	A**	15 <sup>a,b</sup> annually (15)	NONE
Building 778 (Laundry Area non-CA)	B**	15 <sup>c</sup> weekly (180)	NONE
Building 778 Floors (Laundry Area CA)	C**	15 <sup>c</sup> monthly (28)	NONE
Building 778 exterior	D**	Not Routinely Surveyed	NA

\*\*Survey package #2000-0002.

a. Only removable alpha 100cm<sup>2</sup> swipe surveys are performed at each location.

b. Survey dated 5/21/99

c. Survey for removable alpha and removable beta were performed for these surveys.

### 3.2.2 Reconnaissance Level Characterization

Radiological conditions in the B707 Cluster were evaluated through the use of radiological surveys, scans and samples. Direct radiological surveys were performed on the interior and exterior of all buildings for alpha and beta removable activity and alpha total surface activity. Surface scans for alpha were also performed on floor and

walls <2 meters from the floor at each required total surface activity location. PRO-475-RSP-16.01, Radiological Survey/Sampling Package Design, Preparation, Control, Implementation and Closure, Table 1, RLC Survey/Sample Requirements was used as the basis to determine requirements. In all cases, the required number and type of measurements were exceeded. Paint samples for radiological analysis were taken on the interior and exterior of buildings. All paint samples were obtained from locations where contamination from spills and releases could have occurred (i.e., biased locations). Core samples were taken from bulk concrete in the interior of B707. All core samples were obtained from locations of known or suspected spills (i.e., biased locations).

Background (gamma and neutron) radiation, due to co-located DOE source-term material located within some survey areas, results in elevated readings in the beta channel (and in some instances the alpha channel) of portable instrumentation. This radiation tends to appear as beta contamination during surface measurements. Therefore, it was determined that beta measurements would not be collected during RLC and would be taken once source-term materials are reduced throughout the cluster. This is not expected to impact waste estimates or hazard controls because limits for alpha emitters are typically exceeded far before those for beta emitters, and the probability of finding beta contamination without associated alpha contamination is improbable. Additionally, high interference background levels tend to skew the data towards false positives and indicate uncertainty in the presence of contamination. Beta surveys of surface structures are not routinely taken in the B707 Cluster.

### **Assessment of Radiological Surveys/Scans**

Radiological survey and scan results were evaluated with respect to the potential for contamination being present. Survey and scan results were examined to determine if the data exceeded limits prescribed in DOE Order 5400.5. An initial material classification was then made based on the radiological posting for the areas and the results of this assessment. In addition to the survey/scan data, the following assumptions were made when determining waste volume estimates:

- All areas and their contents that are not radiologically posted or posted as Radiological Buffer Areas or Radioactive Material Areas are considered sanitary waste or free-releasable.
- All areas and their contents that are radiologically posted as a Contamination Area or Fixed Contamination Area are considered LLW.
- All areas and their contents that are radiologically posted as a High Contamination Area or Airborne Radioactivity Area are considered LLW or transuranic (TRU) waste.

### **Assessment of Radiological Samples**

Radiological sample results from painted surfaces were evaluated with respect to the potential for contamination being present in the area. Sample results were examined to determine if data exceeded limits prescribed in DOE Order 5400.5. An initial material

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classification for the specific media sampled was made based upon the sample results and the following assumptions:

1. If all paint samples contain radioactive material below the free-release limits in DOE Order 5400.5, the material is considered sanitary waste or free-releasable.
2. If any paint sample contains radioactive material above the free-release limits in DOE Order 5400.5, the material is considered LLW.

Radiological sample results from core samples were evaluated with respect to the potential for contamination being present in the bulk concrete. Sample results were examined to determine if data exceeded RFCA Tier II Soil Action Levels. An initial material classification for the specific media sampled was made based upon the sample results and the following criteria:

1. If all core samples contain radioactive material below the RFCA Tier II Soil Action Levels, the material is considered sanitary waste or free-releasable.
2. If any core sample contains radioactive material above the RFCA Tier II Soil Action Levels, the material is not considered sanitary waste or free-releasable.

### Exclusions from RLC Surveys

In accordance with PRO-475-RSP-16.01, certain areas due to their known radiological conditions were excluded from RLC surveys. These include areas posted as High Contamination Areas and Airborne Radioactivity Areas:

- X-Y Retriever (Room 146) in Module K of Building 707
- Rooms 141 and 142 of Module J of Building 707
- Room 125A and 125B of F Module of Building 707
- Room 131A of Module G of Building 707
- Contamination Control Cell in Module A of Building 707
- Isopress room of Module A of Building 707
- Internal surfaces of equipment (all areas)

### 3.2.3 Sampling and Field Measurement Methods, Procedures and Equipment

Radiological surveys, scans and samples were taken per the requirements of the *RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, November 1999, Revision 0*. All radiological surveys and scans were taken in accordance with the requirements in Procedure 3-PRO-165-RSP-07.02, "Contamination Monitoring Requirements." All radiological samples were taken in accordance with Analytical Services Division (ASD) requirements and PRO-477-RSP-16.03, "Radiological Samples of Building Media".

### 3.2.4 Laboratory Analysis

Radiological samples were analyzed per the requirements of the *RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, November*

1999, Revision 0. All radiological samples were analyzed in accordance with Site requirements (refer to Section 6.1.3).

### 3.3 Chemical Characterization

Chemical characterization was performed to determine the nature and extent of chemical contamination that may be present in the B707 cluster facilities.

Characterization was based on a review of historical and process knowledge, historical data, and RLC data. This section discusses the historical data on these facilities and RLC activities undertaken. All characterization data and related hazards are discussed in Section 4.0. Historical and RLC data are presented in Appendixes A – J.

#### 3.3.1 Summary of Historical Data

Limited historical data exist on chemical contamination of Site buildings. The RFETS Historical Release Report (HRR) discusses past building operations and releases to the environment. The HRR and discussions with building personnel on historical and process knowledge were used to identify potential chemicals and areas of concern. The following contaminants were considered:

- lead and other RCRA metals;
- volatile and semi-volatile organic compounds (VOCs/SVOCs);
- beryllium;
- PCBs; and
- asbestos.

Paints in some buildings were previously evaluated for RCRA metals, and some buildings were sampled to identify asbestos-containing material (ACM). In addition, most buildings where beryllium was used or stored in the past have been assessed for industrial hygiene purposes. Data and other information on B707 cluster facilities from these previous assessments are summarized below and in Table 3-7.

Table 3-7 Summary of Historical Information, B707 Cluster

Building	Above/Below Release Limit?				
	Pb/Metals <sup>2</sup>	VOC/SVOC	Beryllium	PCBs <sup>1</sup>	Asbestos
B707	Below	Below	Indeterminate	Below	<b>Above</b>
B707S	Below	Below	Below	Below	Indeterminate
B708	Below	Below	Below	Below	Indeterminate
B708S	Below	Below	Below	Below	Indeterminate
B711	Below	Below	Below	Below	Indeterminate
B711A	Below	Below	Below	Below	Indeterminate
B718	Below	Below	Below	Below	Indeterminate
B731	Below	Below	Below	Below	Indeterminate
B732	Below	Below	Below	Below	Indeterminate
B778	Below	Below	Below	Below	Indeterminate
Tanks	Below	Below	Below	Below	Indeterminate

- 1 Some PCB-containing ballasts exist in the lighting systems of buildings that contain fluorescent lights.
- 2 Debris containing Pb/metals in paint may be managed as non-hazardous (solid) waste as long as it is not scabbled or otherwise made to constitute a separate waste stream. The paint constitutes a minor portion (<1% of the waste by weight).

### 3.3.1.1 Lead (Pb) and Other Metals in Paint

Limited analyses for Pb and other metals in paint were performed on Building 707 and its associated cluster buildings. In 1997, six samples from Room 125 within F Module and 8 samples from Rooms 181, 181A, 181B, 181C, 182A and 182B were analyzed utilizing total metals analysis by atomic absorption spectroscopy. Results are given in Table 3-8.

Table 3-8 Lead in Paint (analysis by AA spectroscopy)

Sample Number	Color of Paint	Location	Analytical Result (mg/kg)
7079701284401	Not reported	South wall between Rms. 181 and 181A	1,100
7079701284402	Not reported	East wall between Rms. 181 and 181B	300
7079701284403	Not reported	East wall, entry to 181B door jamb	300
7079701284404	Not reported	West wall of 181B, adjacent to door	200
7079701284405	Not reported	West wall of 181C	900
7079701284406	Not reported	East wall of 181A	200
7079701284407	Not reported	South wall of 182A	<90
7079701284408	Not reported	North wall of 182B	<90
7079701304401	Brown	Rm. 125, south personnel door	400
7079701304402	Brown	Rm. 125, south cargo door	1,300
7079701304403	Brown	Rm. 125, north personnel door	15,000
7079701304404	Tan	Rm. 125, north interior personnel door	1,100
7079701304405	Tan	Rm. 125, north wall next to interior personnel door	27,000
7079701304406	Turquoise	Rm. 125, south, inside personnel airlock	2,300

Then in 1998, 164 locations throughout the B707 cluster were analyzed by *in situ* analysis utilizing a Niton portable X-ray fluorescence device. Of these locations, only 5 showed the presence of lead at detectable levels. Data concerning these 5 positive locations are given in Table 3-9. Since a Niton unit analyzes lead content of paint *in situ* (i.e., without it being removed from the substrate), values can only be expressed in mg of lead per cm<sup>2</sup>, rather than on a per weight basis.

**Table 3-9 Locations in B707 Cluster Testing Positive for Lead**

Sample Number	Color of Paint	Location	Analytical Result (mg/cm <sup>2</sup> )
52	Orange	B707, Column G-2	1.0
93	Yellow	B778, men's locker room	2.9
94	Orange	B707, Module A, north side, column H-2	1.4
260	Gray	B708, steel I-beam support column	2.3
261	Gray	B708, steel I-beam support column	10.0

Raw data for all analyses are given in Appendix A-1.

Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream. *Therefore, these historical lead analyses are most applicable to scabbling operations or to situations where IH&S must determine respiratory safeguards where paint is to be removed and can potentially become airborne.*

### 3.3.1.2 VOCs/SVOCs

Tetrachloroethylene and carbon tetrachloride storage tanks and process lines exist throughout B707, but all of these systems have been drained. However, since these systems have not been flushed, it is expected that residual amounts of their original contents exist within the systems.

Historical spills/releases on building surfaces (e.g., floors) have for the most part been cleaned up. No evidence of spills involving VOC or SVOC was observed on floors during the walkdown inspection. It is expected that, due to the vapor pressure of these chemicals, spills on floors not cleaned up would have evaporated. However, residuals from spills in some gloveboxes remain (in SETs 2 and 3). VOC/SVOC above RCRA characteristic TCLP level are not expected. This does not address F-Listing issues associated with waste generated in conjunction with the 707 C-Pit system.

### 3.3.1.3 PCBs

In 1991, one of the six transformers located on the rooftop of B707 was identified as leaking PCB-containing dielectric oil. Further investigation revealed that rainwater had carried PCBs, via a downspout, from the contaminated rooftop to the soil below. An extensive PCB cleanup was initiated in 1991 and 1992 under TSCA regulations, and the rooftop was ultimately declared free of PCB contamination. The contaminated soil area (named area PCB-25) was remediated during the second half of September 1995. Approximately 64.8 yd<sup>3</sup> of soil were removed from an area immediately south of the main entrance doorway of B707 (east side of the building) using backhoes, front-end loaders, excavators, bobcats, and hand shovels. The PCB-25 site was confirmed at <10 ppm PCBs by weight using EPA Method 8080 (refer to *Closeout Report for the Removal*

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of Polychlorinated Biphenyls, RF/RMRS-97-044, Rev. 0). Based on the confirmatory sampling, the area was given NFA ("no further action") status. Documentation of cleanup is provided in Appendix A-1.

A specialized paint associated with PCBs was applied to radiologically contaminated areas within B707. This paint is purple in color (although it is referred to by building personnel as the "magenta paint"). If scabbled, IH&S must determine precautions to be taken for the scabbling operation. In addition, scabbled paint from high radiologically contamination areas will have to be managed in compliance with RCRA and TSCA regulations.

### 3.3.1.4 Beryllium

Historical data from the *B707 Building Indoctrination Handout* state that beryllium is likely to be present in the following areas of B707:

- Internal areas of glovebox lines;
- Lathes and tooling equipment in Module G;
- Vacuum bake-out furnaces;
- Pressure chambers in Room 131A;
- Module A Zone 1 exhaust plenum;
- Internal return ductwork of Zone 2 HVAC systems that serve Modules F, G and H;
- Internal areas of autoclave equipment in Module H.

Additionally, the *RFETS List of Known Beryllium Areas* lists the rooms in B707 and B778, shown in Table 3-10, that are suspected of being contaminated with beryllium. However, accessible surfaces in these areas were sampled by the CBDPP, and no samples were found to contain beryllium above the detectable limit of  $0.1 \mu\text{g}/100\text{cm}^2$ .

Table 3-10 Beryllium Surface Smear Results for B707 and B778.

Room	Locations (for equipment, values are for external surfaces)	No. of Samples	Sample ID Numbers	Any Detected Be? ( $> 0.1 \mu\text{g}/100 \text{ cm}^2$ )
B707				
140	Floor, homogenizing furnace, SAAM alarm and support table, portable stairs, fire box, oxygen analyzer, drum top, glove port, Conveyor S-16, other equipment	36	707-04071999-35-001 through 707-04071999-35-036	No
132A	Floor, work table shelf top, computer turntable, universal power supply, shelf, optical comparator, other equipment	16	707-04071999-35-037 through 707-04071999-35-052	No
132	Floor, monitor, shelf, sealing unit, visual comparator, work table,	14	707-04071999-35-052 through 707-	No

Room	Locations (for equipment, values are for external surfaces)	No. of Samples	Sample ID Numbers	Any Detected Be? ( $> 0.1 \mu\text{g}/100 \text{ cm}^2$ )
B707				
	cutting equipment		04071999-35-066	
130	Floor, table, glove box, control box, digital letterwriter, compressed gas cylinder, suction hose, power supply, valometer, other equipment	19	707-04071999-35- 067 through 707- 04071999-35-085	No
130A	Floor, transducer axis counter, shelf, drum, air compressor, visicorder	10	707-04071999-35- 086 through 707- 04071999-35-095	No
167	Floor, Antech sample pre-heating unit, power supply, preheater, Cell AR4, residue storage rack, calorimeter cell	3	707-04071999-35- 108 through 707- 04071999-35-119	No
169	Floor, stainless steel table, tool box, Pu isotopic system	8	707-04121999-35- 120 through 707- 04121999-35-127	No
171	Floor, Pu assay AR9, desk top and drawer, cabinet top, storage rack, power supply to P3, preheating PH2, breaker box top	14	707-04121999-35- 128 through 707- 04121999-35-141	No
173	Floor, cabinet, dolly, gamma spec. unit, wall vent	10	707-04121999-35- 142 through 707- 04121999-35-151	No
179	Floor, Pu Antech equipment, printer top, Trifid Pu isotopic system, Pu analysis isotopic network	7	707-04121999-35- 152 through 707- 04121999-35-158	No
184	Floor, drums, toolbox, table top, desk top, cabinet	18	707-04121999-35- 159 through 707- 04121999-35-176	No
126	Floor, drums, cart, shelf, vent, control box, storage rack	24	707-04131999-35- 184 through 707- 04131999-35-207	No
125	Floor, drums, partitions, vents	8	707-04131999-35- 208 through 707- 04131999-35-223	No
135A	Floor, drums, paper towel dispenser, shelf	7	707-04131999-35- 224 through 707- 04131999-35-230	No
135B	Floor, drums, paper towel dispenser, shelf, autoclave	6	707-04131999-35- 231 through 707- 04131999-35-236	No
135D	Floor, drums, paper towel dispenser, shelf	7	707-04131999-35- 237 through 707- 04131999-35-243	No
135E	Floor, drums, shelf	6	707-04131999-35- 244 through 707- 04131999-35-249	No
135F	Floor, shelf, panel	7	707-04131999-35- 250 through 707- 04131999-35-256	No
135	Lab table, cabinet, control units,	18	707-04131999-35-	No

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Room	Locations (for equipment, values are for external surfaces)	No. of Samples	Sample ID Numbers	Any Detected Be? ( $> 0.1 \mu\text{g}/100 \text{ cm}^2$ )
<b>B707</b>				
	various equipment		257 through 707-04131999-35-274	
165E, 159, ladies room, 153A, 162, 160, 153, conf. room, hallway	Shelf, desk tops, file cabinets floors	14	707-05121999-35-287 through 707-05121999-35-300	No
100	Floor, table tops, desks, tool box, glovebox external surfaces, carts, vents	55	707-05131999-35-301 through 707-05131999-35-355	No
MAA corridors, dress out area, 178, 180, 185, count room	Floors, shelves, tool boxes, window sills, tables	19	707-05131999-35-356 through 707-05131999-35-374	No
<b>B778</b>				
100 (laundry)	Floor, cabinet, shelf top, computer top, refrigerator top, control panels, respirator washer, hot water line, HDPE belts, equipment	29	778-06231999-35-001 through 778-06231999-35-029	No

### 3.3.1.5 Asbestos

In April and May of 1992, a baseline asbestos inspection and sampling operation was conducted in B707 and B778 by RFETS IH&S, with the support of RFETS Radiological Operations, Maintenance, and Pipefitters. In this inspection, 403 samples for suspect ACM were taken, of which 184 were positive for asbestos. Positively identified ACM included various floor and ceiling tiles, thermal systems insulation, and wallboard.

A total of 270 photographs were taken to document sample locations, and sample locations were summarized on 18 CAD drawings. These CAD drawings are included in Appendix A-1.

The locations of samples that were shown to contain asbestos in this historical data are:

- **Module F:** Wallboard in Rm. 126.
- **Module G:** Floor tile in Rm. 132.
- **Module H:** Thermal insulation for high temperature water and for domestic cold water pipes in Rm. 190.
- **Second floor:** Thermal systems insulation on boilers and on steam, steam condensate, brine supply, hot water, dehumidifier / Kathene, and chilled water pipes throughout 2nd floor.

- **CA and RBA rooms:** Wallboard and floor tile in Corridor R; Spackle at west end of Corridor S; Mastic along north wall of Corridor S; Ceiling tile at intersection of Corridors F and K.
- **Administrative ("cold") offices and corridors:** Floor tile outside Rm. 149 in Corridor E, and in Rms. 159, 168, 181, 181C; Wallboard on west wall of Rm. 159; Conduit on south wall of Rm. 181B; Ceiling tiles in Corridor A; Thermal systems insulation in Rm. 159B on steam, drain, and cold water pipes.
- **Building 778:** Ceiling and floor tile, mastic, and insulation.

### 3.3.2 Reconnaissance Level Characterization

Historical data and process knowledge for each of the B707 cluster facilities were reviewed based upon the following potential contaminants of concern: metals, volatile and semi-volatile organic chemicals, beryllium, PCBs, and asbestos. RLC data were collected only in those instances in which data gaps were identified.

Because of historical spills/releases, core samples from B707 floor areas were collected and analyzed for metals. In addition, the potential for beryllium contamination exists in areas within B707 where beryllium operations took place, so beryllium sampling was conducted. Finally, several buildings and trailers contain suspected asbestos-containing material, and were inspected and sampled accordingly.

Sampling for hazardous constituents was limited to RCRA characteristic metals and to areas outside of RCRA unit boundaries. Limitation of the analytical suite to RCRA characteristic metals was based on knowledge of historical chemical processes. Specifically, metals were suspected within the Kathabar system solutions, which were the only notable solution processes that took place outside of RCRA units. Sampling for volatile organic compounds (VOCs) was not implemented, as VOCs were primarily limited to closed systems within RCRA units. Further, if spilled, VOCs would have volatilized over the time frame in question (several years), and would not have penetrated to any appreciable depth within typical concrete slabs (i.e., permeability of concrete is very low in the absence of fractures). PCB releases in the cluster have already been addressed through successful remedial actions (Appendix A-1).

Sampling was limited to the building cluster's non-RCRA Unit areas for three primary reasons:

1. The vast majority of the B707 Cluster waste volume (concrete rubble and debris) will result from areas that are not RCRA units; thus, non-RCRA unit sampling is more representative of the cluster's structures as a whole.
2. The scope of this RLCR, which is a gross assessment of buildings throughout the defined cluster, is not consistent with a RCRA unit-based sampling scheme, where the units must be addressed on an individual basis.

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3. Sampling of RCRA units is premature at this time, as sampling (and DQOs) must be consistent within the negotiated regulatory framework specific to each RCRA unit. Further, many of the RCRA units (i.e., the secondary containment systems as part of the building's structure, following removal of piping, tanks, pumps, ancillary equipment, etc.) will ultimately be classified as Hazardous Debris (6 CCR 1007-3 §268.45) and treated with respect to Alternative Treatment Standards to the extent practical. Alternative Treatment Standards for hazardous debris include extraction technologies such as high-pressure steam and water sprays (hydrolyzing). Where this scenario is realized, sampling requirements are minimal (ibid.).

For non-RCRA areas, both biased and random sampling methods were implemented to characterize hazardous constituents (RFETS, 11/99). Biased samples targeted areas of known spills (i.e., Kathene), whereas random samples were performed throughout the building to guard against false negatives (i.e., concluding contamination is not present when, in fact, it is present).

### 3.3.2.1 Metals

#### B711 Cooling Tower - Chromium

Historical data and process knowledge indicate the use of a hexavalent chromium-containing fungicide/algicide in the B711 cooling tower. However, the wooden slats and beams in the tower are greenish-tinted, arsenic-treated ("wolmanized") wood, which contains chromium due to the wood treatment process. Solid waste, in this case, wolmanized wood, that consists of discarded arsenic-treated wood or wood products and that exceeds the TCLP threshold for RCRA hazardous waste codes D004 through D017 is not considered hazardous waste, per 40 CFR 261.4(b)(9). Since such material is exempt regardless of its chromium content, and since previous characterization of wood slats from the similarly-constructed B709 cooling tower showed no exceedence of the TCLP thresholds, no analysis for RCRA metals in the wood of B711 was required.

With regard to any sediment contained in the blowdown pit of the tower, it is not feasible to collect samples of the sediment, since this cooling tower is still regularly in use, and the pit area is continually flooded with about 2 feet of water. Therefore, no analysis for RCRA metals in the sediment was conducted, although it is recommended that, prior to final disposition of the structure when water is no longer flooding the pit, the sediment should be characterized for RCRA metals that may have leached from the wolmanized wood (via TCLP).

#### B707 Kathabar System - Lead and Chromium

B707 contains a Kathabar Dehumidifying System, which consists of multiple storage tanks, pumps, and exchanges connected by pipes that run throughout several modules. This system developed leaks, allowing the Kathene fluid (a lithium chloride solution) to leak out onto the concrete floors and other surfaces. This caused cracking in the concrete. Also, a hexavalent chromium-based fungicide may have been used to inhibit fungus growth within the system. Additionally, the storage tanks were reported to

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contain lead, and may have leached the lead from the tank. Therefore, concrete core sampling of areas where Kathene leakage occurred, as well as randomly chosen areas throughout the first and second floors, was conducted as a part of RLC. These samples were analyzed for RCRA metals by TCLP.

### **Lead in Paint**

No further characterization for lead or other metals in paint was conducted.

Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise segregated into a separate waste stream.

### **3.3.2.2 VOCs/SVOCs**

Some staining on the concrete floors was observed during walkdown, but the precise nature of the substance(s) causing the stains was not determined. Carbon tetrachloride and tetrachloroethylene were stored in tanks in B707, and these tanks were connected to process areas by pipes. Due to the vapor pressure of these solvents, it is unlikely that even if spills occurred, there would still be contamination within the concrete. No odor of solvents was detected on walkdown. Therefore, the concrete core samples taken were not analyzed for VOCs/SVOCs.

### **3.3.2.3 Beryllium**

Historical data and process knowledge indicate the use and storage of beryllium and beryllium-containing materials at various locations in B707. Even though B707 has been previously sampled for beryllium, data gaps were identified. Therefore, additional sampling was conducted as part of RLC at various locations in B707, including above false ceilings, on ventilation grates, and on the surfaces of equipment known or suspected to be internally contaminated with beryllium.

### **3.3.2.4 PCBs**

Based on process and historical knowledge and building walkdown, no PCB sampling of surfacial media was conducted nor warranted during RLC.

A transformer on the roof is known from historical data to have leaked PCB-containing dielectric fluid, however, the roof was decontaminated, and the contaminated soil was removed (refer to the *Closeout Report for the Removal of Polychlorinated Biphenyls*, RF/RMRS-97-044, Rev. 0).

A specialized paint associated with PCBs was applied to radiologically contaminated areas within B707. This paint is purple in color (although it is referred to by building personnel as the "magenta paint"). If scabbled, IH&S must determine precautions to be taken for the scabbling operation. In addition, scabbled paint from high radiologically

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contamination areas will have to be managed in compliance with RCRA regulations.

However, even if such paints or coatings were present, Environmental Waste Compliance Guidance #32, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, states that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b), and therefore, need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met.

### **3.3.2.5 Asbestos**

Based on historical data on B707 and B778, no additional ACM inspections or sampling and analysis were required during RLC. ACM inspections were necessary for all the other cluster structures. In addition, sampling of potential ACM was required for B707S, B708, B711 and B711A.

## **3.3.3 Sampling and Field Measurement Methods, Procedures, and Equipment**

### **3.3.3.1 Chromium and Other RCRA Metals**

Samples were collected for TCLP metals analysis in three general areas:

- Wood slats and beams in the B711 Cooling Tower;
- B711 Cooling Tower basin sediment; and
- Concrete in B707.

All samples were collected pursuant to the *Bulk Solids and Liquids Characterization Procedure*, PRO-488-BLCR.

### **3.3.3.2 Beryllium**

For determination of surface beryllium contamination in B707, judgment samples consisting of smears of 100 cm<sup>2</sup> areas were taken using Whatman 41 filter papers as described in *Beryllium Characterization Procedure*, PRO-536-BCPR.

### **3.3.3.3 Asbestos**

For determination of asbestos in building materials, samples of materials were taken using a Wondermaker<sup>TM</sup>, razor knife, or similar appropriate sampling tool as described in *Asbestos Characterization Procedure*, PRO-563-ACPR.

## **3.3.4 Laboratory Analysis**

### **3.3.4.1 Chromium and Other RCRA Metals**

Samples were analyzed by EPA SW-846 Method 1311 (Toxicity Characteristic Leaching

Procedure) and Method 6010B (Inductively Coupled Plasma Atomic Emission Spectroscopy).

#### **3.3.4.2 Beryllium**

Samples were analyzed by EPA SW-846 Method 3051 (Microwave-assisted Acid Digestion) and OSHA Method ID-121 (Flame Atomic Absorption Spectroscopy).

#### **3.3.4.3 Asbestos**

All bulk samples collected during RLC were analyzed utilizing EPA 600/M4-82020, December 1982 (Interim Method for the Detection of Asbestos in Bulk Insulation Samples) by an NVLAP-accredited laboratory. The laboratory participates in both the NVLAP and the AIHA Bulk Asbestos Sampling Quality Assurance Programs.

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#### 4.0 FACILITY HAZARDS

Based on facility and process knowledge, operating and spill records, and survey and analytical data collected, radiological, chemical, and unique physical hazards were identified and are presented below by each B707 Cluster facility. Table 4-1 summarizes hazards by facility. Table 4-2 summarizes hazards within B707 by SET and associated with the building exterior. These tables do not reflect equipment that are or may be internally contaminated; the text below does. Internal contamination will be addressed in greater detail during in-process characterization.

Table 4-1 B707 Cluster Contaminants and Hazards

FACILITY HAZARDS	707	778	T707S	708	711/711A/ 718	731	732	707 Tanks
Radiological Contamination	Yes	Yes	No	Yes	Yes	Yes	Yes	No
In-Process Nuc. Material	Yes	No	No	No	No	No	No	No
Nuc. Material Holdup	Yes	No	No	No	No	No	No	No
Other Rad. Mat'l (sources & product)	Yes	No	No	No	No	No	No	No
Rad. Waste Storage	Yes	No	No	No	No	No	No	No
Chem./Haz. Waste Storage	Yes	Yes	No	No	No	No	No	No
Mixed Waste Storage	Yes	No	No	No	No	No	No	No
Chem. Product Storage	Yes	Yes	No	Yes	No	No	No	Yes
Asbestos	Yes	Yes	No	Yes	No	No	?? <sup>2</sup>	No
Lead/Heavy Metals	No	No	No	No	No	No	No	No
Beryllium	Yes	No	No	No	No	No	No	No
PCBs <sup>1</sup>	No	No	No	No	No	No	No	No
Other Chem. Contamination	Yes	No	No	No	No	No	No	No
Unique Physical Hazards	No	No	No	No	No	No	No	No

<sup>1</sup> Does not include fluorescent light ballasts, which must be disposed of as described in Environmental Waste Compliance Guidance #22, *Management of Fluorescent Light Ballasts*.

<sup>2</sup> Did not inspect; airborne radioactivity area.

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**Table 4-2 B707 Contaminants and Hazards**

EXTERIOR & SETS	SET 1	SET 2	SET 3	SET 4	SET 5	SET 6	SET 7	SET 8	SET 9	SET 10	SET 11	SET 12	SET 13	Bldg. Ext.
HAZARDS														
Radiological Contamination <sup>1</sup>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
In-Process Nuc. Material	Yes	No	No	Yes	No	No	No	No	Yes	Yes	No	Yes	No	No
Nuc. Material Holdup	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Other Rad. Mat'l (sources & product)	Yes	No	No	No	No	No	No	Yes	Yes	Yes	No	No	No	No
Rad. Waste Storage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Chem./Haz. Waste Storage	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No
Mixed Waste Storage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Chem. Product Storage	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No
Asbestos	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No
Lead/Heavy Metals <sup>1</sup>	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Beryllium <sup>1</sup>	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No
PCBs <sup>2</sup>	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No
Other Chem. Contamination <sup>1</sup>	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No
Unique Physical Hazards	No	No	No	No	No	No	No	No	No	No	No	No	No	No

<sup>1</sup> Does not include internally contaminated equipment.<sup>2</sup> Does not include fluorescent light ballasts. *Isopress in Module B may have contained PCB oil in the past.*

Most of the radiological survey points were below the Minimum Detectable Concentration (MDC) of the instrument. Many of the survey points were above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There were a few points that were above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Many of the radiological sample results were above the Minimum Detectable Activity (MDA) of the instrument.

Estimates of radioactive contamination within the B707 Cluster are presented below in Table 4-3 by survey area. The estimates only reflect contamination detected during the RLC surveys. Estimates do not include high contamination areas, airborne radioactivity areas, and other areas not surveyed because of known contamination. Also, estimates do not reflect RLC sampling results. Therefore, the total amount of contaminated area is considerably greater than the total amount of contaminated area presented in Table 4-3. The total area of contamination is included in the *Building 707 Closure Project Waste Management Plan*. In addition, the total numbers of measurements indicated only reflect the numbers of measurements taken on building surfaces. The numbers do not include measurements taken on equipment. Table 4-4 classifies the survey areas per the DPP and MARSSIM.

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**Table 4-3 Contamination Estimates of the B707 Cluster, Based on RLC Measurements, by Survey Area**

SURVEY AREA	TOTAL NO. OF MEASUREMENTS	NO. OF MEASUREMENTS INDICATING CONTAMINATION	GROSS ESTIMATE OF CONTAMINATED SURFACE AREA (square meters)	
	Remov. $\alpha/\beta$ and Total $\alpha$	Remov. $\alpha/\beta$ and Total $\alpha$	Floors & Walls ( $\leq 2$ m high)	Walls ( $>2$ m high)
PACKAGE ID: 99-0002				
A	93	0	0	0
B	95	0	0	0
C	89	0	0	0
D	89	0	0	0
E	95	0	0	0
F	95	3	39	0
G	85	0	0	0
H	85	0	0	0
I	85	0	0	0
J	85	0	0	0
K	85	0	0	0
L	85	0	0	0
M	92	19	197	0
N	89	4	40	0
O	89	30	246	15
P	112	2	13	0
Q	82	2	23	0
R	82	3	26	0
S	137	6	32	0
T	99	7	111	0
U	125	0	0	0

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	TOTAL NO. OF MEASUREMENTS	NO. OF MEASUREMENTS INDICATING CONTAMINATION	GROSS ESTIMATE OF CONTAMINATED SURFACE AREA (square meters)	
			Floors & Walls ( $\leq 2$ m high)	Walls ( $> 2$ m high)
V	Remov. $\alpha/\beta$ and Total $\alpha$ 200	Remov. $\alpha/\beta$ and Total $\alpha$ 6	43	0
W	129	7	48	0
X	129	7	60	0
Y	144	0	0	0
Z	113	0	0	0
AA	64	0	0	0
BB	54	6	N/A <sup>1</sup>	0
CC	54	6	N/A <sup>1</sup>	0
DD	38	0	0	0
EE	38	0	0	0
FF	30	0	0	0
GG	30	0	0	0
JJ	35	12	N/A <sup>1</sup>	0
PACKAGE ID: 2000-0002				
A	47	1	29	0
B	87	0	0	0
C	87	0	0	0
D	40	17	N/A <sup>1</sup>	0
E	30	11	6	0
G	37	0	0	0
H	30	0	0	0

<sup>1</sup>N/A = Not Available

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Table 4-4 Survey Area Classification

SURVEY AREA	SET	CLASSIFICATION (Per DPP; Type 1, 2 or 3)*	CLASSIFICATION (Per MARRSIM; Non-impacted, Class 3, 2 or 1)**
PACKAGE ID: 99-0002			
A	11	2	2
B	11	2	2
C	11	2	2
D	11	2	2
E	11	2	2
F	11	2	2
G	11	2	2
H	11	2	2
I	11	2	2
J	11	2	2
K	11	2	2
L	11	2	2
M	1	3	1
N	2	3	1
O	3	3	1
P	4	3	1
Q	5	3	1
R	6	3	1
S	7	3	1
T	8	3	1
U	12	2	2
V	12	2	2
W	12	2	2
X	9&10	2	2
Y	13	1	3
Z	16	1	3
AA	15	1	3
BB	15	2	2
CC	17	2	2
DD	14	1	3
EE	15	1	3
FF	15	1	3
GG	15	2	2
JJ	17	2	2
PACKAGE ID: 2000-0002			
A	17	2	2
B	17	2	2
C	17	2	2
D	17	2	2
E	17	3	1
F	17	2	2
G	17	1	3
H	17	1	3

\*Under the DPP, Type 1 facilities are considered "free of contamination," Type 2 facilities contain some radiological or hazardous substance contamination, and Type 3 facilities contain extensive radiological contamination.

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**\*\*Under MARRSIM, Non-impacted areas are areas where there is an extremely low probability of residual contamination; Class 3 areas are impacted areas with little or no potential for delivering a dose above release criterion, and little or no potential for small areas of elevated activity; Class 2 areas are areas with low potential for delivering a dose above the release criterion, and little or no potential for small areas of elevated activity; and Class 1 areas are areas with potential for delivering a dose above the release criterion, and potential for small areas of elevated activity.**

Findings that are presented below by survey area indicate the presence and extent of radiological contamination. In some cases, even though some contamination is present, the majority of the survey area is not contaminated, and is thus stated for project planning purposes. However, the classification of the survey area is based on the presence of contamination. Therefore, if a survey area contains some contamination, even though the majority of a survey area may be non-contaminated, the area is classified as a MARSSIM Class 1 impacted area.

Asbestos-containing material is present in most of the cluster buildings in several forms (e.g., tile and insulation). Also, there is beryllium contamination within Modules F and G of B707, and beryllium is present in several of the B707 gloveboxes and equipment (e.g., in Modules A, F, G, H, and J), as well as in B707 piping and the second floor plenum. In addition, the Kathabar systems on the second floor of B707 may be contaminated with metals (e.g., lead and chromium), and some buildings have fluorescent light ballasts containing PCBs. There are no other significant chemical hazards.

Physical hazards associated with the buildings consist of those common to standard industrial environments and include hazards associated with energized systems, utilities, gas cylinders, trips and falls, and forklift operations. There are no unique hazards associated with the different facilities. The buildings have been relatively well maintained and are in good physical condition, and therefore, do not present hazards associated with building deterioration. Physical hazards are controlled by the Site Safety and Industrial Hygiene Program, which is based on OSHA regulations and standard industry practices.

Note that some hazards can change before the facilities are dispositioned. Operations, including building deactivation, are still on-going within the facilities. For example, types and quantities of hazardous materials and their locations may change. Also, levels of contamination in different areas may increase or decrease. Hazardous characterization will continue after RLC until completion of the Pre-Demolition Survey.

#### **4.1 Building 707**

##### **4.1.1 Radiological Hazards**

Radiological survey results on the interior indicate that radiological hazards vary greatly (from minimal to extensive) depending upon the processes taking place in the specific survey area. During RLC, Modules A through E, and G, J and K were posted as CAs. Some modules are periodically posted as ARAs during bag-out activities. Modules F and H were posted as RBAs, however, there are radiation areas within both, and Module F includes a CA, a HCA, and an ARA. Corridors that surround the modules are

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posted as either RBAs or CAs. The entire 2<sup>nd</sup> floor is posted as an RBA. Equipment on both floors is internally contaminated. Survey results on the exterior indicate that no radiological hazards are present. During decommissioning activities such as equipment/material strip-out, radiological surveys of building surfaces and equipment will be needed to detect any radiological hazards that may be present under equipment or in areas that were not accessible during RLC.

#### 4.1.1.1 Survey Area A (99-0002)

This Survey Area is located in NE corner of Room 200, 2<sup>nd</sup> floor of Building 707. This Survey Area is North of Column D-4 and East of Column G-3. The total surface area of the Survey Area is 640 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are minimal. Survey results on the HC-101 Heat Chamber door indicate that a radiological hazard exists. All other survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the majority of Survey Area A can be considered non-contaminated.

No radiological samples were required for this Survey Area.

#### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 37 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 26 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 80 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 37 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 26 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All but one of the 80 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. HC-101, the Heat Chamber door, had an alpha total surface activity of 404 dpm/100 cm<sup>2</sup> and an alpha removable activity of 39 dpm/100 cm<sup>2</sup>. The Heat Chamber door has been contained (covered).

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.1.1.2 Survey Area B (99-0002)**

This Survey Area is located in the NW corner of Room 200, 2<sup>nd</sup> floor of Building 707. This Survey Area is North of Column K-4 and West of Column G-3. The total surface area of the Survey Area is 640 m<sup>2</sup>.

All radiological survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area B can be considered non-contaminated.

Concrete sample results indicate that radiological hazards are below RFCA Tier II Soil Action Levels. No paint samples were required for this Survey Area.

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## Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 35 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 57 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 35 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 57 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

One sample was acquired from bulk concrete, selected in an area of a known or suspected spill. Radionuclide concentrations from the bulk concrete core sample (RIN 00A1197) 002.003 were less than 1 pCi/g for each uranium isotope of interest ( $^{233/234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$ ) and each transuranic isotope of interest ( $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$ ).

Concentrations are 1 to 3 orders of magnitude less than respective RFCA Tier II Soil Action Levels, as a comparison to current acceptable levels allowed in environmental media.

No radiological paint samples were required for this Survey Area.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded.

#### **4.1.1.3 Survey Area C (99-0002)**

This Survey Area is located in the SE corner of Room 200, 2<sup>nd</sup> floor of Building 707. This Survey Area is South of Column D-4 and East of Column G-5. The total surface area of the Survey Area is 640 m<sup>2</sup>.

All radiological survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area C can be considered non-contaminated.

No radiological samples were required for this Survey Area.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 34 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 58 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 34 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 58 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### Radiological Samples

No radiological samples were required for this Survey Area.

#### 4.1.1.4 Survey Area D (99-0002)

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This Survey Area is located in the SW corner of Room 200, 2<sup>nd</sup> floor of Building 707. This Survey Area is South of Column K-4 and West of Column G-5. The total surface area of the Survey Area is 640 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are minimal. Survey results on valves V33, V35 and V-36B indicate that a radiological hazard exists. All other survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the majority of Survey Area D can be considered non-contaminated.

Concrete sample results indicate that radiological hazards are below RFCA Tier II Soil Action Levels. No paint samples were required for this Survey Area.

### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 34 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 58 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 34 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

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All 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All but three of the 58 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Valves V33, V35 and V-36B had alpha total surface activities of 119, 143 and 147 dpm/100 cm<sup>2</sup> and alpha removable activities of 3, 0 and 0 dpm/100 cm<sup>2</sup>, respectively, indicating fixed contamination.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

Two samples were acquired from bulk concrete, selected in areas of known or suspected spills. Radionuclide concentrations from the bulk concrete core samples 001.003 and 008.003 were all less than 1 pCi/g for each uranium isotope of interest (<sup>233/234</sup>U, <sup>235</sup>U, and <sup>238</sup>U) and each transuranic isotope of interest (<sup>241</sup>Am and <sup>239/240</sup>Pu). Concentrations are 1 to 3 orders of magnitude less than respective RFCA Tier II Soil Action Levels, as a comparison to current acceptable levels allowed in environmental media.

No paint samples were required for this Survey Area.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded.

#### **4.1.1.5 Survey Area E (99-0002)**

This Survey Area is located in the East half of Room 210, 2<sup>nd</sup> floor of Building 707. This Survey Area is East of Columns G-7, G-9 and G-11. The total surface area of the Survey Area is 841 m<sup>2</sup>.

All radiological survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area E can be considered non-contaminated.

No radiological samples were required for this Survey Area.

### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 35 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 35 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 35 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.1.1.6 Survey Area F (99-0002)**

This Survey Area is located in the West half of Room 210, 2<sup>nd</sup> floor of Building 707. This Survey Area is West of Columns G-7, G-9 and G-11. The total surface area of the Survey Area is 841 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are present. Survey results on pumps P-10A and P-10C, the gasket on HC-105 Heat Chamber door, and the floor near pumps P-10A and P-10C indicate that a radiological hazard exists. All other survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area F can be considered contaminated.

Concrete sample results indicate that radiological hazards are below RFCA Tier II Soil Action Levels. No paint samples were required for this Survey Area.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 35 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 35 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All but three of the 35 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Three locations on the floor near pumps P-10A and P-10C had alpha total surface activities of 16,675, 34,766 and 4,574 dpm/100 cm<sup>2</sup> and alpha removable activities of 3, 1,083 and 27 dpm/100 cm<sup>2</sup> respectively, indicating fixed and removable contamination

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All but two of the 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Pumps P-10A and P-10C had alpha total surface activities of 285 and 1937 dpm/100 cm<sup>2</sup> and alpha removable activities of 0 and 6 dpm/100 cm<sup>2</sup> respectively, indicating fixed contamination. The comments section of this survey indicates that the gasket on HC-105 Heat Chamber door had an alpha total surface activity of 43,000 dpm/100 cm<sup>2</sup>.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### Radiological Samples

Two samples were acquired from bulk concrete, selected in areas of known or suspected spills. Radionuclide concentrations from the bulk concrete core samples (RIN 00A1197) 006.003 and 007.003 were all less than 1 pCi/g for each uranium isotope of interest (<sup>233/234</sup>U, <sup>235</sup>U, and <sup>238</sup>U) and each transuranic isotope of interest

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( $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$ ). Concentrations are 1 to 3 orders of magnitude less than respective RFCA Tier II Soil Action Levels, as a comparison to current acceptable levels allowed in environmental media.

No radiological paint samples were required for this Survey Area.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded.

#### 4.1.1.7 Survey Area G (99-0002)

This Survey Area is located in the NE corner of Room 220, 2<sup>nd</sup> floor of Building 707. This Survey Area is North of Column D-14 and East of Column G-13. The total surface area of the Survey Area is 640 m<sup>2</sup>.

All radiological survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area G can be considered non-contaminated.

No radiological samples were required for this Survey Area.

#### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.1.1.8 Survey Area H (99-0002)**

This Survey Area is located in the NW corner of Room 220, 2<sup>nd</sup> floor of Building 707. This Survey Area is North of Column K-14 and West of Column G-13. The total surface area of the Survey Area is 640 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are minimal. Survey results on FU-16 indicate that a radiological hazard exists. All other survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the majority of Survey Area H can be considered non-contaminated.

Radiological sample results indicate that radiological hazards in concrete are below RFCA Tier II Soil Action Levels. No paint samples were required for this Survey Area.

### **Radiological Surveys**

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Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All but one of the 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. FU-16

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had an alpha total surface activity of 102 dpm/100 cm<sup>2</sup> and an alpha removable activity of 18 dpm/100 cm<sup>2</sup> respectively, indicating slight contamination above the limits.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

Two samples were acquired from bulk concrete, selected in areas of known or suspected spills. Radionuclide concentrations from the bulk concrete core samples (RIN 00A1197) 004.003 and 005.003 were all less than 1 pCi/g for each uranium isotope of interest (<sup>233/234</sup>U, <sup>235</sup>U, and <sup>238</sup>U) and each transuranic isotope of interest (<sup>241</sup>Am and <sup>239/240</sup>Pu). Concentrations are 1 to 3 orders of magnitude less than respective RFCA Tier II Soil Action Levels, as a comparison to current acceptable levels allowed in environmental media.

No radiological paint samples were required for this Survey Area.

The radiological sample requirements for this Survey Area, specified in PRO-477-RSP-16.03, were met or exceeded.

#### **4.1.1.9 Survey Area I (99-0002)**

This Survey Area is located in the SE corner of Room 220, 2<sup>nd</sup> floor of Building 707. This Survey Area is South of Column D-14 and East of Column G-15. The total surface area of the Survey Area is 640 m<sup>2</sup>.

All radiological survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area I can be considered non-contaminated.

No radiological samples were required for this Survey Area.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### Radiological Samples

No radiological samples were required for this Survey Area.

#### 4.1.1.10 Survey Area J (99-0002)

This Survey Area is located in the SW corner of Room 220, 2<sup>nd</sup> floor of Building 707. This Survey Area is South of Column K-14 and West of Column G-15. The total surface area of the Survey Area is 640 m<sup>2</sup>.

All radiological survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area J can be considered non-contaminated.

No radiological samples were required for this Survey Area.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup>

surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.1.1.11 Survey Area K (99-0002)**

This Survey Area is located in the Northern portion of Room 240, 2<sup>nd</sup> floor of Building 707. This Survey Area is North of Columns M-3, N-3, O-3 and P-3. The total surface area of the Survey Area is 523 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are minimal. Survey results on the HC-104 Heat Chamber door and two ducting locations indicate that a radiological hazard exists. All other survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the majority of Survey Area K can be considered non-contaminated.

Concrete sample results indicate that radiological hazards are below RFCA Tier II Soil Action Levels. No paint samples were required for this Survey Area.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All but three of the 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. HC-104 was labeled with 5,000 cpm fixed alpha contamination with a corresponding 9 dpm/100 cm<sup>2</sup> alpha removable activity. An exhaust duct location was labeled with 1,100 cpm fixed alpha contamination with a corresponding 0 dpm/100 cm<sup>2</sup> alpha removable activity. The second duct location had an alpha total surface activity of 290 dpm/100 cm<sup>2</sup> and an alpha removable activity of -20 dpm/100 cm<sup>2</sup>.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

#### Radiological Samples

One sample was acquired from bulk concrete, selected in an area of a known or suspected spill. Radionuclide concentrations from the bulk concrete core sample (RIN 00A1197) 003.003 were less than 1 pCi/g for each uranium isotope of interest ( $^{233/234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$ ) and each transuranic isotope of interest ( $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$ ). Concentrations are 1 to 3 orders of magnitude less than respective RFCA Tier II Soil Action Levels, as a comparison to current acceptable levels allowed in environmental media.

No radiological paint samples were required for this Survey Area.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded.

#### 4.1.1.12 Survey Area L (99-0002)

This Survey Area is located in the Southern portion of Room 240, 2<sup>nd</sup> floor of Building 707. This Survey Area is South of Columns M-3, N-3, O-3 and P-3. The total surface area of the Survey Area is 627 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are minimal. Survey results on a pipe near PL-102 indicate that a radiological hazard exists. All other survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the majority of Survey Area L can be considered non-contaminated.

No radiological samples were required for this Survey Area.

#### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 25 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All but one of the 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The pipe near PL-102 was labeled 10,000 dpm/100 cm<sup>2</sup> removable alpha contamination with a corresponding 20,000 dpm/100 cm<sup>2</sup> fixed alpha contamination. Resurveys indicate 2,000 and 40,000 dpm/100 cm<sup>2</sup> removable alpha contamination with a corresponding 50,000 and 100,000 dpm/100 cm<sup>2</sup> fixed alpha contamination.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.1.1.13 Survey Area M (99-0002)**

This Survey Area is located inside of Module A, Room 100 of Building 707, excluding Isopress Room. The total surface area of the Survey Area is 634 m<sup>2</sup>.

90

- 3 biased (paint) media samples.

One sample was to be collected around a posted High Contamination Area. No areas within Module E were posted as High Contamination Areas, therefore, the sample was omitted.

Zero of 3 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Zero of 3 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

#### 4.1.1.18 Survey Area R (99-0002)

This Survey Area is located inside of Module F, including Rooms 125, 126 and 127 of Building 707. This Survey Area excludes Rooms 125A and 125B due to High Contamination Area and Airborne Radioactivity Area postings. The total surface area of the Survey Area is 537 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are extensive. Survey results on floors, walls < 2 meters from the floor, and equipment indicate that a radiological hazard exists. Numerous radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area R can be considered contaminated.

Sample results indicate that radiological hazards in paint are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 12 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 50 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 12 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

Two of the 50 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The locations had alpha total surface activities of 186 and 102 dpm/100 cm<sup>2</sup> and alpha removable activities of 0 and 0 dpm/100 cm<sup>2</sup> respectively, indicating fixed contamination.

One of the 12 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The location had an alpha total surface activity of 312 dpm/100 cm<sup>2</sup> and alpha removable activities of 0 dpm/100 cm<sup>2</sup>, indicating fixed contamination.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Ten of the 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual:

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### Radiological Samples

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were:

102

- 3 biased (paint) media samples.

The following measurements were collected:

- 3 biased (paint) media samples.

Zero of 3 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Zero of 3 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

#### **4.1.1.19 Survey Area S (99-0002)**

This Survey Area is located inside of Module G, including Rooms 107, 187, 130, 130A, 130B, 131, 132, 132A, 133 and 133A of Building 707. This Survey Area excludes Room 131A due to High Contamination Area posting. The total surface area of the Survey Area is 634 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are extensive. Survey results on floors, walls < 2 meters from the floor, and equipment indicate that a radiological hazard exists. Numerous radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area S can be considered contaminated.

Sample results indicate that radiological hazards in paint are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 92 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 35 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.

- 40 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 92 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 35 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 40 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

Three of the 92 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The locations had alpha total surface activities of 252, 355 and 3,942 dpm/100 cm<sup>2</sup> and alpha removable activities of 3, 0 and 3 dpm/100 cm<sup>2</sup>, respectively, indicating fixed contamination.

Six of the 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 35 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Twenty of the 40 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual:

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### Radiological Samples

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 3 biased (paint) media samples.

The following measurements were collected:

- 3 biased (paint) media samples.

Zero of 3 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Zero of 3 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

#### 4.1.1.20 Survey Area T (99-0002)

This Survey Area is located inside of Module H, including Rooms 189, 190, 191, 135 and 136, and Vaults 135A through 135F. The total surface area of the Survey Area is 634 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are extensive. Survey results on floors, walls < 2 meters from the floor, and equipment indicate that radiological hazards exists. Numerous radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area T can be considered contaminated.

Sample results indicate that radiological hazards in paint are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

#### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 72 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 63 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity. Drum storage precluded the ability to collect measurements in Room 136 (9 measurements).
- 11 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 25 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

Six of the 63 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Three of the 11 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Four of the 25 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Five of the 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 3 biased (paint) media samples.

The following measurements were collected:

- 2 biased (paint) media samples.

One sample was to be collected near a criticality drain. No criticality drains are located in Module H, therefore the sample was omitted.

Zero of 2 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Zero of 2 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

#### **4.1.1.21 Survey Area U (99-0002)**

This Survey Area is located in RBA Rooms 167, 169, 173, 175, 179, 180, 181, 181A, 181B, 181C, 182A, 182B, 182C, 183, 184, 184A, 185, 188, 193, 194, 195, 196, 196A and 197 of Building. Room 188 is a posted Contamination Area, but was grouped with this Survey Area due to location. The total surface area of the Survey Area is 891 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are present. Survey results on equipment indicate that a radiological hazard exists. Equipment radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area U can be considered contaminated.

Sample results indicate that radiological hazards in paint are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 72 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 40 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.

- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 75 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 40 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 75 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 40 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Five of the 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### Radiological Samples

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 3 biased (paint) media samples.

The following measurements were collected:

- 1 biased (paint) media samples.

Two samples were to be collected where there was no paint, therefore, the samples were omitted.

Zero of 1 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Zero of 1 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

#### **4.1.1.22 Survey Area V (99-0002)**

This Survey Area includes Corridors H, J, K, L, S, T, U and V, the North ends of Corridors F and G from the NE corner and NW corner of Module D, respectively, to Corridor H, and Rooms 164, 166 and 170. The total surface area of the Survey Area is 921 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are present. Survey results on floors, walls < 2 meters from the floor, and equipment indicate that a radiological hazard exists. Numerous radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area V can be considered contaminated.

Sample results indicate that radiological hazards in paint are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 110 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 98 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.

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- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 110 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 35 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 55 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity. 43 measurement locations were inaccessible due to posted Airborne Radioactivity Areas in the overhead.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

Six of the 110 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 35 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 55 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Four of the 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

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Radiological survey results indicate that radiological hazards are extensive. Survey results on floors, walls < 2 meters from the floor, and equipment indicate that a radiological hazard exists. Numerous radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area M can be considered contaminated.

Paint sample results indicate that radiological hazards are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Concrete sample results indicate that radiological hazards are below RFCA Tier II Soil Action Levels.

### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 17 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 40 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 17 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

Fourteen of the 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The measurements indicate 2,400, 168, 288, 180, 444, 138, 222, 210, 420, 3,456, 3,540, 246, 1,080 and 30 dpm/100 cm<sup>2</sup> alpha total surface activity with

corresponding 3, 0, 3, 0, 0, 0, 9, 0, 279, 0, 3, 12 and 42 dpm/100 cm<sup>2</sup> alpha removable surface activity.

Five of the 17 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The measurements indicate 168, 102, 762, 498 and 192 dpm/100 cm<sup>2</sup> alpha total surface activity with corresponding 6, 0, 0, 3 and 3 dpm/100 cm<sup>2</sup> alpha removable surface activity.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Thirty-eight of the 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Survey results primarily indicate total surface activity measurements above the limits while removable surface activity measurements are below the limits (contamination is fixed).

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### Radiological Samples

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following paint measurements were specified:

- 4 biased (paint) media samples.

The following measurements were collected:

- 4 biased (paint) media samples.

Zero of 4 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. One of 4 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the paint on the floors can be considered contaminated.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

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#### 4.1.1.14 Survey Area N (99-0002)

This Survey Area is located inside of Module B, Room 105 of Building 707. The total surface area of the Survey Area is 634 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are extensive. Survey results on floors, walls < 2 meters from the floor, and equipment indicate that a radiological hazard exists. Numerous radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area N can be considered contaminated.

Paint sample results indicate that radiological hazards are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Concrete sample results indicate that radiological hazards are below RFCA Tier II Soil Action Levels.

#### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 14 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 14 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All but one of the 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The measurement had an alpha total surface activity of 204 dpm/100 cm<sup>2</sup> and an alpha removable activity of 39 dpm/100 cm<sup>2</sup>.

Three of the 14 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The measurements indicate alpha total surface activities of 138, 174 and 138 dpm/100 cm<sup>2</sup> and alpha removable activities of 0, 0 and 0 dpm/100 cm<sup>2</sup> indicated fixed contamination.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Twenty-two of the 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Survey results indicate total surface activity measurements above the limits while removable surface activity measurements are below the limits (contamination is fixed).

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### Radiological Samples

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following paint measurements were specified:

- 4 biased (paint) media samples.

The following measurements were collected:

- 4 biased (paint) media samples.

Zero of 4 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. One of 4 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the paint on the floors can be considered contaminated.

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One sample was acquired from bulk concrete, selected in an area of a known or suspected spill. Radionuclide concentrations from the bulk concrete core samples (RIN 00A1197) 010.003 were less than 1 pCi/g for each uranium isotope of interest ( $^{233/234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$ ) and each transuranic isotope of interest ( $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$ ). Concentrations are 1 to 3 orders of magnitude less than respective RFCA Tier II Soil Action Levels, as a comparison to current acceptable levels allowed in environmental media.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

#### 4.1.1.15 Survey Area O (99-0002)

This Survey Area is located inside of Module C, Room 110 and C-Pit of Building 707. The total surface area of the Survey Area is 634 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are extensive. Survey results on floors, walls < 2 meters from the floor, and equipment indicate that a radiological hazard exists. Numerous radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area O can be considered contaminated.

Paint sample results indicate that radiological hazards are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Concrete sample results indicate that radiological hazards are below RFCA Tier II Soil Action Levels.

### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 58 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 14 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 40 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

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- 58 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 14 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 40 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

Twenty-one of the 58 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Nine of the 14 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Two of the 40 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Thirty-five of the 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following paint measurements were specified:

- 4 biased (paint) media samples.

The following measurements were collected:

- 4 biased (paint) media samples.

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Zero of 4 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Three of 4 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the paint on the floors can be considered contaminated.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

#### **4.1.1.16 Survey Area P (99-0002)**

This Survey Area is located inside of Module D, Room 115 of Building 707. The total surface area of the Survey Area is 634 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are extensive. Survey results on floors, walls < 2 meters from the floor, and equipment indicate that a radiological hazard exists. Numerous radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area P can be considered contaminated.

Sample results also indicate that radiological hazards are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

#### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 7 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 40 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

- 7 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 40 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All but one of the 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The location had an alpha total surface activity of 324 dpm/100 cm<sup>2</sup> and an alpha removable activity of 0 dpm/100 cm<sup>2</sup> respectively, indicating fixed contamination.

All 7 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Fifteen of the 40 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 4 biased (paint) media samples.

The following measurements were collected:

- 3 biased (paint) media samples.

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One sample was to be collected around a posted High Contamination Area. No areas within Module D were posted as High Contamination Areas, therefore, the sample was omitted.

Zero of 3 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Two of 3 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the paint on the floors can be considered contaminated.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

#### 4.1.1.17 Survey Area Q (99-0002)

This Survey Area is located inside of Module E, Room 120 of Building 707. The total surface area of the Survey Area is 634 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are extensive. Survey results on floors, walls < 2 meters from the floor, and equipment indicate that a radiological hazard exists. Numerous radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area Q can be considered contaminated.

Sample results indicate that radiological hazards in paint are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 7 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 40 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 7 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 40 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Two of the 7 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The locations had alpha total surface activities of 108 and 102 dpm/100 cm<sup>2</sup> and alpha removable activities of 0 and 6 dpm/100 cm<sup>2</sup> respectively, indicating fixed contamination.

All 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Sixteen of the 40 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 4 biased (paint) media samples.

The following measurements were collected:

- 3 biased (paint) media samples.

The following measurements were collected:

- 3 biased (paint) media samples.

Zero of 3 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Zero of 3 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

#### **4.1.1.23 Survey Area W (99-0002)**

This Survey Area includes Corridors M, N, P, R and the South ends of Corridors F and G from the NE corner and NW corner of Module D, respectively, extending to the South end of Building 707. This Survey Area also includes Rooms 178 and 178A. The total surface area of the Survey Area is 818 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are present. Survey results on floors and walls < 2 meters from the floor indicate that a radiological hazard exists. Several radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area W can be considered contaminated.

Sample results indicate that radiological hazards in paint are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

#### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 79 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 40 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.

- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 79 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 40 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

Seven of the 79 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 40 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 3 biased (paint) media samples.

The following measurements were collected:

- 3 biased (paint) media samples.

Zero of 3 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Zero of 3 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

#### **4.1.1.24 Survey Area X (99-0002)**

This Survey Area is located inside of Modules J and K of Building 707 excluding Rooms 141, 142 and 146. The total surface area of the Survey Area is 672 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are present. Survey results on floors, walls < 2 meters from the floor, and equipment indicate that a radiological hazard exists. Several radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area X can be considered contaminated.

Paint sample results indicate that radiological hazards are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Concrete sample results indicate that radiological hazards are below RFCA Tier II Soil Action Levels

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 50 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 20 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 50 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 20 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

Fifteen of the 50 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Ten of the 20 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

One of the 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Forty-two of the 45 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following paint measurements were specified:

- 8 biased (paint) media samples.

The following measurements were collected:

- 8 biased (paint) media samples.

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Zero of 8 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Seven of 8 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the paint on the floors can be considered contaminated.

Two samples were acquired from bulk concrete, selected in areas of known or suspected spills. Radionuclide concentrations from the bulk concrete core samples (RIN 00A1197) 012.003 and 013.003 were all less than 1 pCi/g for each uranium isotope of interest ( $^{233/234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$ ) and each transuranic isotope of interest ( $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$ ). Concentrations are 1 to 3 orders of magnitude less than respective RFCA Tier II Soil Action Levels, as a comparison to current acceptable levels allowed in environmental media.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

#### 4.1.1.25 Survey Area Y (99-0002)

This Survey Area includes Non-Radiological Rooms 149, 150, 150A, 150B, 151A, 151B, 151C, 152, 153A, 153B, 153C, 153D, 153E, 154, 155, 155A, 156, 157, 158, 159, 159A, 159B, 159C, 160, 160A, 161, 162, 163, 165A, 165B, 165C, 165D, 165E, 172, 172A, 174, 176 and corridors of Building 707. This Survey Area excludes Rooms 164, 166, 170, 178 and 178A. The total surface area of the Survey Area is 740 m<sup>2</sup>.

Radiological survey results indicate that no radiological hazards are present. No radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area Y can be considered non-contaminated.

No radiological samples were required for this Survey Area.

#### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 129 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 0 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

- 15 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 129 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 0 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 15 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 129 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

No biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity were collected.

All 15 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.1.1.26 Survey Area Z (99-0002)**

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This Survey Area includes the external surfaces/roof of Building 707 (including roof sections 1, 2 and 3). The total surface area of the Survey Area is not estimated.

Radiological survey results on roof/exterior walls indicate that radiological hazards are present. Several radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area Z can be considered contaminated.

Sample results indicate that radiological hazards in paint are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 37 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 26 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

The following measurements were collected:

- 37 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 26 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

All 37 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Five of the 26 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix A-3.

## Radiological Samples

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 2 biased (paint) media samples.

The following measurements were collected:

- 2 biased (paint) media samples.

Zero of 2 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Zero of 2 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix A-3.

### 4.1.2 Chemical Hazards

Surface smears for beryllium contamination were conducted at a total of 59 individual locations within the modules of B707, and four of these samples were determined to have greater than  $0.2 \mu\text{g}/100 \text{ cm}^2$  beryllium. The locations of these samples are given in Table 4-6.

Past and present asbestos sampling shows a significant amount of ACM throughout the building. Refer to Sections 3.3.1.5 and 4.1.2.5.

The Kathabar dehumidifying systems on the second floor of B707 may be contaminated with metals (i.e., lead and chromium), and because these systems leaked, there was the potential for related metal contamination in concrete around the systems. However, analytical results of concrete samples indicate no contamination [i.e., below maximum concentrations for toxicity characteristics (40 CFR 261.24); refer to Section 4.1.2.1].

Historical data show that lead and other RCRA metals are detectable in paint, but this does not preclude disposal of the building debris as non-hazardous (solid) wastes as long as the paint does not constitute its own waste stream (see Section 3.3.2.1).

B707 has some fluorescent light ballasts containing PCBs. A transformer on the roof is known from historical data to have leaked PCB-containing dielectric fluid, but subsequent decontamination of the roof and of subsequent soil contamination was successfully performed and is documented in *Closeout Report for the Removal of Polychlorinated Biphenyls*, RF/RMRS-97-044, Rev. 0. Also, a specialized paint

associated with PCBs was applied to radiologically contaminated areas within B707. This paint is purple in color (although it is referred to by building personnel as the "magenta paint").

Chemical hazards associated with B707 are summarized in Table 4-5.

**Table 4-5 Summary of Building 707 Chemical Hazards<sup>1</sup>**

Contaminant of Concern	Analysis	Historical or RLC?	Above release limit?
Pb/Metals	TCLP and total metals in paint	Historical	Below unless segregated, see Section 4.1.2.1
	TCLP in concrete	RLC	None
VOC/SVOC	None required	NA	NA
Beryllium	Surface smears	Historical and RLC	Above
PCBs	Leaking transformer on east side of rooftop, and soil in area beneath (Remediated)	Historical	Below
	Some fluorescent light ballasts with PCBs		Above <sup>2</sup>
Asbestos	Inspection; sampling of transite, floor tile, pipe insulation, elbows, and fittings	Historical and RLC	Above

<sup>1</sup> Does not include internally contaminated gloveboxes, equipment, piping, plenums, and other systems.

<sup>2</sup> Fluorescent light ballasts must be removed prior to building demolition and disposed of as described in Environmental Waste Compliance Guidance #26, *Fluorescent Light Ballasts*.

NA = no analysis was performed.

#### 4.1.2.1 Lead and Other RCRA Metals

Metals may have been present in process releases that occurred throughout the facility. However, analytical results of core samples taken from process areas indicate no related contamination (refer to Appendix A-2). Also, the Kathabar dehumidifying systems on the second floor of B707 may be contaminated with metals (i.e., lead and chromium), and because these systems leaked, there was the potential for related metal contamination in concrete around the systems. However, analytical results of concrete samples taken around the systems where leaks occurred indicate no contamination [i.e., results are below maximum concentrations for toxicity characteristics (40 CFR 261.24); refer to Appendix A-2].

Historical data exist for analyses for lead and other metals in paint in Building 707 and

its associated cluster buildings, and are reported in Section 3.3.1.1 of this report. However, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream. *Therefore, these historical lead analyses are most applicable to scabbling operations or to situations where IH&S must determine respiratory safeguards where paint is to be removed and can potentially become airborne.*

#### 4.1.2.2 VOCs/SVOCs

Tetrachloroethylene and carbon tetrachloride storage tanks and process lines exist throughout B707, but all of these systems have been drained. However, since these systems have not been flushed, it is expected that residual amounts of their original contents exist within the systems.

Historical spills/releases on building surfaces (e.g., floors) have for the most part been cleaned up. No evidence of spills involving VOC or SVOC was observed on floors during the walkdown inspection. It is expected that, due to the vapor pressure of these chemicals, spills on floors not cleaned up would have evaporated. However, residuals from spills in some gloveboxes remain (in SETs 2 and 3).

#### 4.1.2.3 Beryllium

Historical data discussed in Section 3.3.1.3 of this report show that, of 455 smears taken by the CBDPP in B707 on accessible surfaces in areas where beryllium was handled, no samples were found to contain beryllium above the detectable limit of  $0.1 \mu\text{g}/100\text{cm}^2$ . However, data gaps were identified. Therefore, as part of RLC, surface smears for beryllium contamination were conducted at a total of 59 individual locations within the modules of B707, and four of these locations were determined to have greater than  $0.2 \mu\text{g}/100 \text{ cm}^2$  beryllium. Two additional locations had beryllium surface contamination levels above the beryllium detection limit of  $0.1 \mu\text{g}/100 \text{ cm}^2$ , but were still below the release limit. These locations and their associated beryllium levels are given in Table 4-6. Maps of all 59 sample locations and their associated laboratory reports are contained in Appendix A-2.

Additionally, historical data and process knowledge show that *internal* beryllium contamination exists in several of the B707 gloveboxes and equipment (e.g., in Modules A, F, G, H, and J), as well as in B707 piping and the second floor plenums. Examples of internally contaminated equipment and systems include:

- Internal areas of glovebox lines throughout most modules;
- Lathes and tooling equipment in Module G, as well as pressure chambers in Room 131A of Module G;
- All vacuum bake-out furnaces;
- Module A Zone 1 exhaust plenum;
- Internal return ductwork of Zone 2 HVAC systems that serve Modules F,

- G and H; and
- Internal areas of autoclave equipment in Module H.

Table 4-6. Beryllium Characterization of B707

Sample Number	Module	Location	Analytical Result ( $\mu\text{g}/100\text{ cm}^2$ )	Above/Below Release Limit?
707-03162000-05-024	A	NE corner by GB30, above ceiling tile	< 0.1	Below.
707-03162000-05-025	A	North end, center by S24, above ceiling tile	< 0.1	Below.
707-03162000-05-026	A	S. end by GB75, above ceiling tile	< 0.1	Below.
707-03162000-05-021	B	SE corner by S-8B, above ceiling tile	< 0.1	Below.
707-03162000-05-022	B	South central by GB65, above ceiling tile	< 0.1	Below.
707-03162000-05-023	B	NE corner by GB20, above ceiling tile	< 0.1	Below.
707-03162000-05-017	C	NW corner by GB C120, above ceiling tile	< 0.1	Below.
707-03162000-05-018	C	N end, center by GB C20, above ceiling tile	< 0.1	Below.
707-03162000-05-019	C	NE corner by GB C20, above ceiling tile	< 0.1	Below.
707-03162000-05-020	C	Duplicate of 707-03162000-05-019	< 0.1	Below.
707-03162000-05-014	D	NW corner, above ceiling tile by glovebox 110	< 0.1	Below.
707-03162000-05-015	D	SE corner by GBD35, above ceiling tile	< 0.1	Below.
707-03162000-05-016	D	S. end, center by GBD35, above ceiling tile	< 0.1	Below.
707-03162000-05-0011	E	SW corner, above ceiling tile	< 0.1	Below.
707-03162000-05-012	E	North end, center GB F60, above ceiling tile	< 0.1	Below.
707-03162000-05-013	E	NE corner, by glovebox E20, above ceiling tile	< 0.1	Below.

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707-03162000-05-005	F	Above ceiling tile, center of N part of Rm. 125	0.48	Above.
707-03162000-05-013	F	Grate of ventilation return duct, N wall, Rm. 125	0.46	Above.
707-03162000-05-006	F	Above ceiling tile, SE corner of Rm. 125	0.17	Below.
707-03162000-05-007	F	Room 127, south end, center, above ceiling tile	< 0.1	Below.
707-03232000-05-013	F	Room 125, Return duct north wall	< 0.1	Below.
707-03232000-05-019	F	Room 125A, top of autoclave	< 0.1	Below.
707-03162000-05-009	G	Above ceiling tile, NW entrance way of Module G	0.28	Above.
707-03162000-05-010	G	Field duplicate of 707-03162000-05-010	0.36	Above.
707-04132000-05-005	G	Surface of E lathe	0.24	Above.
707-03162000-05-008	G	Above ceiling tile, center of E end of Module G	0.15	Below.
707-03162000-05-004	G	Room 135 SE corner, above ceiling tile	< 0.1	Below.
707-03232000-05-014	G	Return duct	< 0.1	Below.
707-03232000-05-015	G	Return duct	< 0.1	Below.
707-04132000-05-004	G	West lathe, identification # 707-0094	< 0.1	Below.
707-04132000-05-005	G	East lathe, identification # 707-0094	< 0.1	Below.
707-04132000-05-006	G	Updraft hood, top	< 0.1	Below.
707-04132000-05-007	G	Updraft table, duplicate of 707-04132000-05-006	< 0.1	Below.
707-04132000-05-008	G	680-048 hood, top	< 0.1	Below.
707-04132000-05-009	G	255--79 & 123-022 hood, top	< 0.1	Below.
707-03162000-05-001	H	Light fixture, east end, 8ft high	< 0.1	Below.
707-03162000-05-002	H	Lift fixture, center of room, 8ft high	< 0.1	Below.
707-03162000-05-003	H	Top of entrance to vault 5, 8ft high	< 0.1	Below.

707-03232000-05-016	H	Return duct in vault 1	< 0.1	Below.
707-03232000-05-017	H	Return duct in vault 1	< 0.1	Below.
707-03232000-05-018	H	Duplicate of 707-03232000-05-016	< 0.1	Below.
707-03232000-05-021	H	Room 135B, top of autoclave	< 0.1	Below.
707-03232000-05-022	H	Room 135D, top of autoclave	< 0.1	Below.
707-03232000-05-023	H	Room 135, stainless steel bench on east end of room	< 0.1	Below.
707-03232000-05-024	H	Room 135, duplicate of 707-03232000-05-023	< 0.1	Below.
707-03232000-05-025	H	Room 135, blue oven, identification # 253-055	< 0.1	Below.
707-03232000-05-026	H	Room 135A, tissue dispenser	< 0.1	Below.
707-03232000-05-027	H	Room 135A, shelf on south end	< 0.1	Below.
707-04132000-05-001	K	Between S20 & S18, above ceiling tile	< 0.1	Below.
707-04132000-05-002	K	Between 45 & 55, above ceiling tile	< 0.1	Below.
707-04132000-05-003	K	Between 45 & 55, above ceiling tile	< 0.1	Below.
707-04132000-05-010	J	Top of electrical panel, 7ft high	< 0.1	Below.
707-04132000-05-011	J	Top of decon cabinet, 8ft high	< 0.1	Below.
707-04132000-05-012	J	Top of ACI 670 high level controller, 7ft high	< 0.1	Below.
707-03232000-05-001	Second floor	Room 200, base of plenum 101	< 0.1	Below.
707-03232000-05-002	Second floor	Room 200, floor of plenum 101	< 0.1	Below.
707-03232000-05-003	Second floor	Room 200, base of plenum 103	< 0.1	Below.
707-03232000-05-004	Second floor	Room 200, base of plenum 103	< 0.1	Below.
707-03232000-05-005	Second floor	Room 240, base of plenum 102	< 0.1	Below.
707-03232000-05-006	Second floor	Room 240, floor by plenum 102	< 0.1	Below.
707-03232000-05-007	Second floor	Room 220, base of plenum 107	< 0.1	Below.
707-03232000-05-008	Second floor	Room 220, floor by plenum 107	< 0.1	Below.

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707-03232000-05-009	Second floor	Room 220, base by plenum 108	< 0.1	Below.
707-03232000-05-010	Second floor	Room 220, floor by plenum 108	< 0.1	Below.

#### 4.1.2.4 PCBs

In 1991, one of the six transformers located on the rooftop of B707 was identified as leaking PCB-containing dielectric oil. Further investigation revealed that rainwater had carried PCBs, via a downspout, from the contaminated rooftop to the soil below, and this soil area was named PCB-25. An extensive PCB cleanup was initiated in 1991 and 1992 under applicable regulations, and the rooftop was ultimately declared free of PCB contamination. The soil below was also remediated and confirmed to be <10 ppm PCBs by weight using EPA Method 8080 (*Closeout Report for the Removal of Polychlorinated Biphenyls*, RF/RMRS-97-044, Rev. 0). The remediation confirmation provides the basis for the NFA ("no further action") status. Documentation of cleanup is provided in Appendix A-1.

B707 also contains some fluorescent light ballasts containing PCBs. Contamination of building surfaces from leaking ballasts is unlikely.

The isopress in Module B may have contained PCB oils. This press has been removed. In addition, the motor generators for the furnaces may have contained PCB oils in the past. The areas around the isopress, the furnaces, and any other equipment that may have contained PCBs will be evaluated for PCB contamination after all equipment has been removed.

In addition, a specialized paint associated with PCBs was applied to radiologically contaminated areas within B707. This paint is purple in color (although it is referred to by building personnel as the "magenta paint"). According to Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b), and therefore, need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met. If this paint is to be scabbled, IH&S must determine precautions to be taken during the scabbling operation. Also, the scabble waste stream must be managed pursuant to all applicable regulations.

#### 4.1.2.5 Asbestos

In April and May of 1992, a baseline asbestos inspection and sampling operation was conducted in B707 by RFETS IH&S, with the support of RFETS Radiological Operations, Maintenance, and Pipefitters. During this inspection, 403 samples for suspect ACM were taken, of which 184 were positive for asbestos. Positively identified ACM included various floor and ceiling tiles, thermal systems insulation, and wallboard. Locations are listed in Section 3.3.1.5.

The original report contained a total of 270 photographs that were taken to document sample locations, and sample locations were summarized on 18 CAD drawings. These CAD drawings are included in Appendix A-1.

Based on the historical data, the total estimate for asbestos containing material is:

Ceiling tile	18,000 square feet
Floor tile and mastic	2,000 square feet
Pipe insulation	27,000 linear feet
HVAC/Tank insulation	33,720 square feet

#### 4.1.3 Hazards Summary

Tables 7 - 19 summarize B707 hazards by SET. In addition, chemicals are stored in several rooms, including 189, 105, 110, 120, 127, 186, and the second floor. Chemicals stored include paints, sealants, caulks, adhesives, petroleum products, antifreeze/coolant, solvents, and cleaners. These rooms will have to be characterized for contamination after the chemicals have been removed (i.e., during in-process characterization).

Table 4-7 Hazards Within B707, SET 1

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; extensive; floors, walls <2 m, and equipment. Some equipment and systems are also internally contaminated.
In-Process Nuc. Material	Yes
Nuc. Material Holdup	Yes (see Section 2.2.2)
Other Rad. Mat'l (sources & product)	Yes
Rad. Waste Storage	Yes
Chem./Haz. Waste Storage	None
Mixed Waste Storage	Yes
Chem. Product Storage	Yes
Asbestos	None
Lead/Heavy Metals	None. Analysis of lead in paint not required unless scabbled.
Beryllium	Yes; Zone 1 exhaust plenum; internal areas of glovebox lines; vacuum bake-out furnaces.
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	Yes; residual oil and carbon tetrachloride in all machining gloveboxes.
Unique Physical Hazards	None

**Table 4-8 Hazards Within B707, SET 2**

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; extensive; floors, walls <2 m, and equipment. Some equipment and systems are also internally contaminated.
In-Process Nuc. Material	None
Nuc. Material Holdup	Yes (see Section 2.2.2)
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	Yes
Chem./Haz. Waste Storage	Yes
Mixed Waste Storage	Yes
Chem. Product Storage	None
Asbestos	None
Lead/Heavy Metals	None. Analysis of lead in paint not required unless scabbled.
Beryllium	Yes; internal areas of glovebox lines; vacuum bake-out furnaces.
PCBs	Yes, Isopress may have contained PCB fluid. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	Yes; residual oil and carbon tetrachloride in some gloveboxes.
Unique Physical Hazards	None

**Table 4-9 Hazards Within B707, SET 3**

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; extensive; floors, walls <2 m, and equipment. Some equipment and systems are also internally contaminated.
In-Process Nuc. Material	None
Nuc. Material Holdup	Yes (see Section 2.2.2)
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	Yes
Chem./Haz. Waste Storage	Yes
Mixed Waste Storage	Yes
Chem. Product Storage	None
Asbestos	None

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Lead/Heavy Metals	None. Analysis of lead in paint not required unless scabbled.
Beryllium	Yes: internal areas of glovebox lines; vacuum bake-out furnaces.
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	Yes; residual oil and carbon tetrachloride in all machining gloveboxes.
Unique Physical Hazards	None

Table 4-10 Hazards Within B707, SET 4

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; extensive; floors, walls <2 m, and equipment. Some equipment and systems are also internally contaminated.
In-Process Nuc. Material	Yes
Nuc. Material Holdup	Yes (see Section 2.2.2)
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	Yes
Chem./Haz. Waste Storage	None
Mixed Waste Storage	None
Chem. Product Storage	None
Asbestos	None
Lead/Heavy Metals	None. Analysis of lead in paint not required unless scabbled.
Beryllium	Yes: internal areas of glovebox lines; vacuum bake-out furnaces.
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	None
Unique Physical Hazards	None

Table 4-11 Hazards Within B707, SET 5

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; extensive; floors, walls <2 m, and equipment. Some equipment and systems are also internally contaminated.
In-Process Nuc. Material	None
Nuc. Material Holdup	Yes (see Section 2.2.2)
Other Rad. Mat'l (sources & product)	None
Rad. Waste	Yes

Storage	
Chem./Haz. Waste Storage	None
Mixed Waste Storage	Yes
Chem. Product Storage	None
Asbestos	Yes: thermal systems insulation on chilled water pipes, west side of Module E.
Lead/Heavy Metals	None. Analysis of lead in paint not required unless scabbled
Beryllium	Yes: internal areas of glovebox lines; vacuum bake-out furnaces.
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	None
Unique Physical Hazards	None

Table 4-12 Hazards Within B707, SET 6

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; extensive; floors, walls <2 m, and equipment. Some equipment and systems are also internally contaminated.
In-Process Nuc. Material	None
Nuc. Material Holdup	Yes (see Section 2.2.2)
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	Yes
Chem./Haz. Waste Storage	None
Mixed Waste Storage	Yes
Chem. Product Storage	None
Asbestos	Yes: wallboard in Rm. 126; Module F.
Lead/Heavy Metals	None. Analysis of lead in paint not required unless scabbled.
Beryllium	Yes: above ceiling tile, center of N part of Rm. 125; grate of ventilation return duct, N wall, Rm. 125. Also in equipment.
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	None
Unique Physical Hazards	None

Table 4-13 Hazards Within B707, SET 7

HAZARDS	HAZARD DESCRIPTION
Radiological	Yes; extensive; floors, walls <2 m, and equipment. Some equipment and systems are

Contamination	also internally contaminated.
In-Process Nuc. Material	None
Nuc. Material Holdup	Yes (see Section 2.2.2)
Other Rad. Mat'l (sources & product)	No
Rad. Waste Storage	Yes
Chem./Haz. Waste Storage	None
Mixed Waste Storage	Yes
Chem. Product Storage	None
Asbestos	Yes: floor tile in Rm. 132, Module G.
Lead/Heavy Metals	None. Analysis of lead in paint not required unless scabbled.
Beryllium	Yes: above ceiling tile, NW entrance way of Module G; surface of E lathe. Also in equipment.
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	Yes; residual trichloroethylene from degreasing operations.
Unique Physical Hazards	None

**Table 4-14 Hazards Within B707, SET 8**

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; extensive; floors, walls <2 m, and equipment. Some equipment and systems are also internally contaminated.
In-Process Nuc. Material	No
Nuc. Material Holdup	Yes (see Section 2.2.2)
Other Rad. Mat'l (sources & product)	Yes
Rad. Waste Storage	Yes
Chem./Haz. Waste Storage	None
Mixed Waste Storage	None
Chem. Product Storage	None
Asbestos	Yes: thermal insulation for high temp. water & domestic cold water pipes in Rm. 190.
Lead/Heavy Metals	None. Analysis of lead in paint not required unless scabbled.
Beryllium	Yes: internal areas of glovebox lines; vacuum bakeout furnaces; internal return ductwork of Zone 2 HVAC systems; internal areas of autoclave equipment.
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	None
Unique Physical Hazards	None

Table 4-15 Hazards Within B707, SET 9

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; some floors only. Some equipment and systems are also internally contaminated.
In-Process Nuc. Material	Yes
Nuc. Material Holdup	Yes (see Section 2.2.2)
Other Rad. Mat'l (sources & product)	Yes
Rad. Waste Storage	Yes
Chem./Haz. Waste Storage	None
Mixed Waste Storage	Yes
Chem. Product Storage	None
Asbestos	None
Lead/Heavy Metals	None. Analysis of lead in paint not required unless scabbled.
Beryllium	Yes: internal areas of glovebox lines.
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	None
Unique Physical Hazards	None

Table 4-16 Hazards Within B707, SET 10

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; some floors only. Some equipment and systems are also internally contaminated.
In-Process Nuc. Material	Yes
Nuc. Material Holdup	Yes (see Section 2.2.2)
Other Rad. Mat'l (sources & product)	Yes
Rad. Waste Storage	Yes
Chem./Haz. Waste Storage	None
Mixed Waste Storage	Yes
Chem. Product Storage	None
Asbestos	None
Lead/Heavy Metals	None. Analysis of lead in paint not required unless scabbled.

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Beryllium	Yes: internal areas of glovebox lines.
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	None
Unique Physical Hazards	None

Table 4-17 Hazards Within B707, SET 11

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; minimal, except Survey Area F, which has contamination on floor, pumps and plenum. Some equipment and systems are also internally contaminated.
In-Process Nuc. Material	No
Nuc. Material Holdup	Yes (see Section 2.2.2)
Other Rad. Mat'l (sources & product)	No
Rad. Waste Storage	Yes
Chem./Haz. Waste Storage	None
Mixed Waste Storage	None
Chem. Product Storage	Yes
Asbestos	Yes: thermal systems insulation on boilers and on steam, steam condensate, brine supply, hot water, dehumidifier / Kathene, and chilled water pipes throughout 2nd floor; For exhaustive list, see Appendix A-1.
Lead/Heavy Metals	None. Analysis of lead in paint not required unless scabbled. Heavy metal contamination possible in the katabar systems.
Beryllium	Yes: Module A Zone 1 exhaust plenum; internal return ductwork of Zone 2 HVAC systems that serve Modules F, G, and H.
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	None
Unique Physical Hazards	None

Table 4-18 Hazards Within B707, SET 12

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; on some floors only. Some systems are also internally contaminated.
In-Process Nuc. Material	Yes
Nuc. Material Holdup	None

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Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	Yes
Chem./Haz. Waste Storage	None
Mixed Waste Storage	Yes
Chem. Product Storage	Yes
Asbestos	Yes: wallboard and floor tile in Corridor R; spackle at west end of Corridor S; mastic along north wall of Corridor S; ceiling tile at intersection of Corridors F and K.
Lead/Heavy Metals	None. Analysis for lead in paint not required unless scabbled.
Beryllium	None
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	Yes; residual oil and carbon tetrachloride in C-Pit transfer lines.
Unique Physical Hazards	None

Table 4-19 Hazards Within B707, SET 13

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	None
In-Process Nuc. Material	None
Nuc. Material Holdup	None
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	None
Chem./Haz. Waste Storage	None
Mixed Waste Storage	None
Chem. Product Storage	None
Asbestos	Yes: floor tile outside Rm. 149 in Corridor E, and in Rms. 159, 168, 181, 181C; wallboard on west wall of Rm. 159; conduit on south wall of Rm. 181B; ceiling tiles in Corridor A; thermal insulation in Rm. 159B on steam, drain, and cold water pipes.
Lead/Heavy Metals	Analysis not required for lead in paint unless scabbled; No other hazards
Beryllium	None
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	None
Unique Physical Hazards	None

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## 4.2 Building 778

### 4.2.1 Radiological Hazards

#### 4.2.1.1 Survey Area A (2000-002)

This Survey Area includes Building 778 interior East (Non-Radiological). The total surface area of the Survey Area is 1,366 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are minimal. Three survey results on floors, walls < 2 meters from the floor, and equipment indicate that a radiological hazard exists. All other survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the majority of Survey Area A can be considered non-contaminated.

No radiological samples were required for this Survey Area.

### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 11 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 11 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

One of the 45 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The measurement location had an alpha total surface activity of 108 dpm/100 cm<sup>2</sup> and an alpha removable activity of 0 dpm/100 cm<sup>2</sup>, indicating fixed contamination.

All 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 11 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Two of the 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Two ceiling vents had alpha total surface activities of 114 and 174 dpm/100 cm<sup>2</sup> and alpha removable activities of 3 and 0 dpm/100 cm<sup>2</sup> respectively.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix B-3.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.2.1.2 Survey Area B (2000-002)**

This Survey Area includes Building 778 interior West (Non-Radiological). The total surface area of the Survey Area is 1233 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are minimal. One survey result on equipment (i.e., top of plenum in Room 104A) indicates that a radiological hazard exists. All other survey results are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the majority of Survey Area B can be considered non-contaminated.

No radiological samples were required for this Survey Area.

### **Radiological Surveys**

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Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 56 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 21 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 56 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 21 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 56 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 21 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

One of the 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The top

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of a Plenum in Room 104A had an alpha total surface activity of 156 dpm/100 cm<sup>2</sup> and an alpha removable activity of 6 dpm/100 cm<sup>2</sup>.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix B-3.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.2.1.3 Survey Area C (2000-002)**

This Survey Area includes Building 778 interior West (Contamination Area). The total surface area of the Survey Area is 106 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are minimal. All survey results, except two, are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the majority of Survey Area C can be considered non-contaminated.

No radiological samples were required for this Survey Area.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

- 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

All 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

One of the 10 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 10 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

One of the 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. A dryer had an alpha total surface activity of 474 dpm/100 cm<sup>2</sup> and an alpha removable activity of 3 dpm/100 cm<sup>2</sup>.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix B-3.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.2.1.4 Survey Area D (2000-002)**

This Survey Area includes Building 778 roof/exterior. The total surface area of the Survey Area is not estimated.

Radiological survey results indicate that radiological hazards are present. Survey results on roof/exterior walls indicate that a radiological hazard exists. Several radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area D can be considered contaminated.

No radiological samples were required for this Survey Area.

### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

Eleven of the 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Six of the 10 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix B-3.

### Radiological Samples

No radiological samples were required for this Survey Area.

#### 4.2.2 Chemical Hazards

#### 4.2.2.1 Lead and Other RCRA Metals

There are no significant metal hazards within B778. No production processes involving metals were conducted within B778, and no spills containing metals are known to have occurred. B778 operations involved the cutting of lead shielding. Some equipment in the metal cutting shop (e.g., shears), therefore, could contain some lead. All lead pieces, including fines, are collected and recycled. Based on process history and historical knowledge and building walkdowns, no metal analysis was conducted or warranted.

Historical data exist for analyses for lead in paint in Building 778, and are reported in Section 3.3.1.1 of this report. Only the yellow paint in the men's locker room was shown to contain lead, with the concentration at  $2.9 \text{ mg/cm}^2$  as analyzed using a Niton portable X-ray fluorescence device. However, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream. *Therefore, historical lead analyses are most applicable to scabbling operations or to situations where IH&S must determine respiratory safeguards where paint is to be removed and can potentially become airborne.*

#### 4.2.2.2 VOCs/SVOCs

Process history indicates that tetrachloroethylene and carbon tetrachloride were used throughout B707, however, these solvents were not used in any significant quantities in B778. Also, there are two hazardous waste accumulation areas in B778 (i.e., Unit # 2278 on the dock, and Unit # 2467 in Room 110), but there are no records of spills involving VOCs or SVOCs contamination. In addition, no evidence of spills involving VOCs or SVOCs was observed on floors during walkdowns. It is expected that, due to the vapor pressure of these chemicals, any spills not cleaned up would have evaporated.

#### 4.2.2.3 Beryllium

The CBDPP List of Known Beryllium Areas (LKBA) lists the laundry, Room 100, as potentially having beryllium contamination. However, the CBDPP later carried out 29 smear samples of the laundry, including the floor, cabinet, shelf top, computer top, refrigerator top, control panels, respirator washer, hot water line, HDPE belts, and other equipment, and no location was found to contain a detectable amount of beryllium (see Table 3-10). No data gaps were identified. Therefore, no RLC analysis for beryllium was required.

#### 4.2.2.4 PCBs

Based on process and historical knowledge and building walkdowns, no PCB sampling of surfacial media was conducted nor warranted during RLC. However, even if PCB

paints or coatings are present, Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, states that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b), and therefore, need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met.

The building also contains some fluorescent light ballasts containing PCBs

#### 4.2.2.5 Asbestos

Based on the historical data, the total estimate for asbestos containing material is:

Ceiling tile	5,000 square feet
Floor tile and mastic	1,000 square feet
Pipe insulation	1,000 linear feet

#### 4.2.3 Hazards Summary

Table 4-20 summarizes B778 hazards. In addition, chemicals are stored in Rooms 100, 105, 110 and 111. Chemicals stored include paints, sealants, caulks, petroleum products and adhesives. These rooms will have to be characterized for contamination after the chemicals have been removed (i.e., during in-process characterization).

**Table 4-20 B778 Hazards**

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; minimal; on floor, equipment and roof. Some equipment and systems may also internally contaminated.
In-Process Nuc. Material	None
Nuc. Material Holdup	None
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	None
Chem./Haz. Waste Storage	Yes
Mixed Waste Storage	None
Chem. Product Storage	Yes
Asbestos	Yes: ceiling tile, floor tile and mastic, and thermal systems insulation.
Lead/Heavy Metals	None. Lead in paint need not be analyzed unless scabbled. Metal cutting equipment could contain Pb.
Beryllium	None
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.

Other Chem. Contamination	Yes; residual oil and carbon tetrachloride in C-Pit transfer lines.
Unique Physical Hazards	None

### 4.3 Building T707S

#### 4.3.1 Radiological Hazards

##### 4.3.1.1 Survey Area G (2000-002)

This Survey Area includes Building T707S interior. The total surface area of the Survey Area is ~ 20 m<sup>2</sup>.

Radiological survey results indicate that no radiological hazards are present. No radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area G can be considered non-contaminated.

No radiological samples were required for this Survey Area.

#### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 27 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity. Three locations were inaccessible.
- 10 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 20 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity. Ten locations were omitted due to the small amount of equipment to survey.

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All 27 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 10 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 20 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix C-2.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.3.1.2 Survey Area H (2000-002)**

This Survey Area includes Building T707S exterior. The total surface area of the Survey Area is ~ 20 m<sup>2</sup>.

Radiological survey results indicate that no radiological hazards are present. No radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area H can be considered non-contaminated.

No radiological samples were required for this Survey Area.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the roof and exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the roof and exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

All 30 random/uniform (unbiased) total surface activity measurements on the roof and exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix C-2.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.3.2 Chemical Hazards**

##### **4.3.2.1 Lead and Other RCRA Metals**

Historical data and process knowledge do not give any reason to suspect metals contamination of the facility. Only new oil products and used oils were stored in the shed. Therefore, no metals analysis was required for RLC.

No historical data exist for analyses for lead in paint in Building 707S. However, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream.

##### **4.3.2.2 VOCs/SVOCs**

Oil products and used oils were stored in this shed, and oil blending was conducted. Also, oil spills did occur. However, historical data and process history indicate that only uncontaminated oils were stored in the shed. Therefore, no organic analysis was required for RLC.

##### **4.3.2.3 Beryllium**

Historical data and process history give no reason to suspect beryllium contamination of this facility. The facility is not listed on the CBDPP List of Known Beryllium Areas (LKBA). No RLC analysis for beryllium was required.

#### 4.3.2.4 PCBs

Based on process and historical knowledge and building walkdowns, no PCB sampling of surfacial media was conducted nor warranted during RLC. PCB oils were not stored in this shed, nor were waste oils containing PCBs stored in this shed.

Also, even if PCB paints or coatings are present, Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, states that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b), and therefore, need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met.

#### 4.3.2.5 Asbestos

Three samples of potential ACM (drywall and tape joint compound) were taken and analyzed. Analytical results indicate no ACM (refer to Appendix C-1).

#### 4.3.3 BT707S Hazards Summary

Table 4-21 summarizes BT707S hazards.

Table 4-21 B707S Hazards

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	None
In-Process Nuc. Material	None
Nuc. Material Holdup	None
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	None
Chem./Haz. Waste Storage	None
Mixed Waste Storage	None
Chem. Product Storage	None
Asbestos	None
Lead/Heavy Metals	None. No need for analysis for lead in paint unless it is to be scabbled.
Beryllium	None
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	None. Spills of uncontaminated oil occurred.
Unique Physical	None

Hazards	
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#### 4.4 Buildings 708

##### 4.4.1 Radiological Hazards

###### 4.4.1.1 Survey Area AA (99-0002)

This Survey Area includes the interior of Building 708. The total surface area of the Survey Area is 662 m<sup>2</sup>.

Radiological survey results indicate that no radiological hazards are present. No radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area AA can be considered non-contaminated.

Sample results indicate that radiological hazards in paint are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

#### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 4 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 35 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 4 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 30 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.

- 25 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity. 10 measurement locations were inaccessible; B708S, the breathing air compressor on skids, has been removed from the site.

All 30 random/uniform (unbiased) total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 4 biased total surface activity measurements on the floor and walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 30 surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 25 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix D-3.

### **Radiological Samples**

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 2 biased (paint) media samples.

The following measurements were collected:

- 2 biased (paint) media samples.

Zero of 2 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Zero of 2 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix D-3.

#### 4.4.1.2 Survey Area BB (99-0002)

This Survey Area includes the external surfaces/roof of Building 708. The total surface area of the Survey Area is not estimated.

Radiological survey results indicate that radiological hazards are present. Biased survey results on roof/exterior walls indicate that a radiological hazard exists. Several radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area BB can be considered contaminated. However, the activity measured could be from naturally occurring radioactive material (i.e., radon decay products) and not DOE-added material. The roof will be further investigated during in-process characterization.

Sample results indicate that radiological hazards in paint are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

#### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 24 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 24 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

All 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Six of the 24 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix D-3.

### **Radiological Samples**

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 1 biased (paint) media samples.

The following measurements were collected:

- 1 biased (paint) media samples.

Zero of 1 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Zero of 1 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix D-3.

### **4.4.2 Chemical Hazards**

#### **4.4.2.1 Lead and Other RCRA Metals**

Historical data and process knowledge do not give any reason to suspect metals contamination of the facility. Therefore, no analysis was required for RLC.

No historical data exist for analyses for lead in paint in Building 708. However, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream.

#### **4.4.2.2 VOCs/SVOCs**

Historical data and process history give no reason to suspect extensive use of or spills of VOCs or SVOCs in this facility, and no evidence of such spills was observed upon walkdown inspection. Used oils were stored in this building, but these oils were uncontaminated. Therefore, no analysis was required for RLC.

#### 4.4.2.3 Beryllium

Historical data and process history give no reason to suspect beryllium contamination of this facility. The facility is not listed on the CBDPP List of Known Beryllium Areas (LKBA). No RLC analysis for beryllium was required.

#### 4.4.2.4 PCBs

Based on process and historical knowledge and building walkdowns, no PCB sampling of surfacial media was conducted nor warranted during RLC. However, even if PCB paints or coatings are present, Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, states that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b), and therefore, need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met.

#### 4.4.2.5 Asbestos

Sixteen samples of potential ACM were taken and analyzed. Analytical results indicate ACM >1% in 7 of the samples (i.e., in building insulation and in drywall and tape joint compound (refer to Appendix D-2). Based on the ACM inspection and sampling and analysis, the total estimate for asbestos containing material is:

- 800 linear feet of pipe insulation;
- 100 square feet of floor tile;
- 100 square feet of ceiling tile; and
- 600 square feet of spray-applied texture on I-beams.

#### 4.4.3 B708 Hazards Summary

Table 4-22 summarizes B708 hazards. In addition, chemicals are stored in the building. Chemicals stored include petroleum products, water treatment chemicals, small quantities of thinners and solvents, antifreeze and coolant, adhesives, and caulks. These rooms will have to be characterized for contamination after the chemicals have been removed (i.e., during in-process characterization).

Table 4-22 B708 Hazards

HAZARDS	HAZARD DESCRIPTION
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Radiological Contamination	Yes; some on roof.
In-Process Nuc. Material	None
Nuc. Material Holdup	None
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	None
Chem./Haz. Waste Storage	None
Mixed Waste Storage	None
Chem. Product Storage	Yes
Asbestos	Yes; insulation, floor and ceiling tile, and surface texture.
Lead/Heavy Metals	None. No need for analysis for lead in paint unless it is to be scabbled.
Beryllium	None
PCBs	None. Fluorescent light ballasts with PCBs must be disposed of as per site procedure.
Other Chem. Contamination	Diesel fuel, ethylene glycol and cooling tower chemicals.
Unique Physical Hazards	None

## 4.5 Buildings 711, 711A and 718

### 4.5.1 Radiological Hazards

#### 4.5.1.1 Survey Area EE

Survey Area EE includes Buildings 711 (Cooling Tower), 711A (Emergency Diesel Pump for Cooling Tower) and 718 (Cooling Tower Service Building). The total surface area of the Survey Area is 393 m<sup>2</sup>.

Radiological survey results indicate that no radiological hazards are present. No radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area EE can be considered non-contaminated.

### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 44 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

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- 38 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity. Six measurement locations were inaccessible; tanks are located underground.

All 38 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix E-2.

### **Radiological Samples**

The following measurements were specified in the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999:

- 4 biased volumetric samples.
- 2 biased (paint) media samples.

The following measurements were collected:

- 0 biased volumetric samples.
- 0 biased (paint) media samples.

Four volumetric samples were to be collected inside Buildings 711 (Cooling Tower). The Cooling Tower was flooded with ~ 20 inches of water, therefore, the samples were omitted. Two paint samples were to be collected where there was no paint, therefore, the samples were omitted.

#### **4.5.1.2 Survey Area FF (99-0002)**

This Survey Area includes the roof/exterior of Building 711 (Cooling Tower). The total surface area of the Survey Area is not estimated.

Radiological survey results indicate that no radiological hazards are present. No radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area FF can be considered non-contaminated.

No radiological samples were required for this Survey Area.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

All 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix E-2.

### **Radiological Samples**

No radiological samples were required for this Survey Area.

#### **4.5.1.3 Survey Area GG (99-0002)**

This Survey Area includes the roof/exterior of Building 718. The total surface area of the Survey Area is not estimated.

Radiological survey results indicate that radiological hazards are present. Survey results on the roof are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area GG can be considered contaminated. However, the activity measured could be from naturally occurring radioactive material (i.e., radon decay products) and not DOE-added material. The roof will be further investigated during in-process characterization.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

Sixteen of the 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix G-2.

### **Radiological Samples**

The following measurements were specified the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999:

- 1 biased (paint) media samples.

The following measurements were collected:

- 0 biased (paint) media samples.

One sample was to be collected where there was no paint, therefore, the sample was omitted.

### **4.5.2 Chemical Hazards**

#### **4.5.2.1 Lead and Other RCRA Metals**

No historical data exist for analyses for lead in paint in Buildings 711, 711A and 718. Historical data and process knowledge do not give any reason to suspect metals contamination of B711A or B718.

Historical data and process knowledge indicate the use of a hexavalent chromium-containing fungicide/algicide in the B711 cooling tower. However, the wooden slats and beams in the tower are greenish-tinted, arsenic-treated ("wolmanized") wood, which contains chromium due to the wood treatment process. Solid waste that consists of

discarded arsenic-treated wood or wood products and that exceeds the TCLP threshold for RCRA hazardous waste codes D004 through D017 is not considered hazardous waste, per 40 CFR 261.4(b)(9). Therefore, no analysis for RCRA metals in the wood of B711 was required.

It was not feasible to collect samples of the sediment present in the basin at the base of the structure, as this cooling tower is still in use, and the pit area is continually flooded with about 2 feet of water. Therefore, no analysis for RCRA metals in the sediment was performed, although it is recommended that prior to final disposition of the structure, when water is no longer flooding the pit, the sediment should be characterized for RCRA metals that may have leached from the wolmanized wood and/or be present from the use of hexavalent chromium-containing fungicide/algicide.

Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream.

#### 4.5.2.2 VOCs/SVOCs

Historical data and process history give no reason to suspect use of or spills of VOC or SVOC in these facilities, and no evidence of such spills was observed upon walkdown inspection. Therefore, no analysis was required for RLC.

#### 4.5.2.3 Beryllium

Historical data and process history give no reason to suspect beryllium contamination of these facilities. They are not listed on the CBDPP List of Known Beryllium Areas (LKBA). No RLC analysis for beryllium was required.

#### 4.5.2.4 PCBs

Based on process and historical knowledge and building walkdowns, no PCB sampling of surfacial media was conducted nor warranted during RLC. However, even if PCB paints or coatings are present, Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, states that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b), and therefore, need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met.

#### 4.5.2.5 Asbestos

Four samples of potential ACM (drywall and tape joint compound) were taken and analyzed. Analytical results indicate no ACM (refer to Appendixes E - G).

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### 4.5.3 B711, B711A and B718 Hazards Summary

Table 4-23 summarizes B711, B711A and B718 hazards.

**Table 4-23 B711, B711A and B718 Hazards**

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; some on the B718 roof.
In-Process Nuc. Material	None
Nuc. Material Holdup	None
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	None
Chem./Haz. Waste Storage	None
Mixed Waste Storage	None
Chem. Product Storage	None
Asbestos	None
Lead/Heavy Metals	No need for analysis for lead in paint unless it is to be scabbled. Chromium and arsenic may be present in wolmanized wood of B711 but are exempt from RCRA. Metals may have leached from wood into blowdown pit, but sampling not feasible due to presence of water in the pit (B711 is still in use as a cooling tower).
Beryllium	None
PCBs	None
Other Chem. Contamination	None
Unique Physical Hazards	None

## 4.6 Building 731

### 4.6.1 Radiological Hazards

#### 4.6.1.1 Survey Area CC (99-0002)

This Survey Area includes the inside of Building 731. The total surface area of the Survey Area is ~47 m<sup>2</sup>.

Radiological survey results indicate that radiological hazards are present. Survey results on floors, walls < 2 meters from the floor, and equipment indicate that radiological hazards exist. Several radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area CC can be considered contaminated.

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Sample results indicate that radiological hazards in paint are below the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

## Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 12 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 12 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 10 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity.
- 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity.

Five of the 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Three of the 12 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 10 total surface activity measurements on the ceiling and walls > 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup>

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surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Ten of the 30 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix H-2.

### **Radiological Samples**

Radiological samples were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 1 biased (paint) media samples.

The following measurements were collected:

- 1 biased (paint) media samples.

Zero of 1 media sample results are above the contamination limits for uranium prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Zero of 1 media sample results are above the contamination limits for transuranics prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological sample requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological sample results are summarized in Appendix H-2.

#### **4.6.1.2 Survey Area JJ (99-0002)**

This Survey Area includes the roof/exterior of Building 731. The total surface area of the Survey Area is not estimated.

Radiological survey results indicate that radiological hazards are present. Survey results on roof/exterior walls indicate that a radiological hazard exists. Several radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area JJ can be considered contaminated.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 5 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.
- 5 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity.

Twelve of the 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

All 5 biased total surface activity measurements on the roof/exterior walls < 2 meters from the floor with associated swipes for removable alpha and beta-gamma activity and 1 m<sup>2</sup> surface scans for alpha activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix H-2.

### **Radiological Samples**

The following measurements were specified in the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999:

- 1 biased (paint) media samples.

The following measurements were collected:

- 0 biased (paint) media samples.

One sample was to be collected where there was no paint, therefore, the sample was omitted.

#### 4.6.2 Chemical Hazards

##### 4.6.2.1 Lead and Other RCRA Metals

Historical data and process knowledge, including the Waste Stream and Residue Identification and Characterization System, do not give any reason to suspect metal contamination of the facility. The system under went RCRA closure in 1995 and has not been used to manage RCRA waste since. Systems within the building contained plenum deluge water and process wastes, but these did not contain metals according to the Waste and Residue Identification and Characterization System. Solutions with concentrated metals did not go through B731. Any facility or system contamination would be below the RCRA hazardous characteristic thresholds. Therefore, no metal analysis was required for RLC.

No historical data exist for lead analysis in paint in Building 731. However, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream.

##### 4.6.2.2 VOCs/SVOCs

Historical data and process knowledge, including the Waste Stream and Residue Identification and Characterization System, do not give any reason to suspect VOC/SVOC contamination of the facility. Systems within the building contained plenum deluge water and process wastes, but these did not contain VOCs/SVOCs. Solvent solutions did not go through B731. Therefore, no VOC/SVOC analysis was required for RLC.

##### 4.6.2.3 Beryllium

Historical data and process history give no reason to suspect beryllium contamination of this facility. The facility is not listed on the CBDPP List of Known Beryllium Areas (LKBA). No RLC analysis for beryllium was required.

##### 4.6.2.4 PCBs

Based on process and historical knowledge and building walkdowns, no PCB sampling of surfacial media was conducted nor warranted during RLC. However, even if PCB paints or coatings are present, Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, states that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-

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hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b), and therefore, need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met.

#### 4.6.2.5 Asbestos

Inspection by a CDPHE-certified asbestos inspector determined no potential asbestos-containing material.

#### 4.6.3 B731 Hazards Summary

Table 4-24 summarizes B731 hazards.

**Table 4-24 B731 Hazards**

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; inside surfaces and equipment (internal and external), plus roof.
In-Process Nuc. Material	None
Nuc. Material Holdup	None
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	Yes, tanks.
Chem./Haz. Waste Storage	None
Mixed Waste Storage	None
Chem. Product Storage	None
Asbestos	None
Lead/Heavy Metals	None. No need for analysis for lead in paint unless it is to be scabbled.
Beryllium	None
PCBs	None
Other Chem. Contamination	None
Unique Physical Hazards	None

#### 4.7 Building 732

##### 4.7.1 Radiological Hazards

##### 4.7.1.1 Survey Area E (2000-002)

This Survey Area includes Building 732 Pit interior. The total surface area of the Survey Area is  $< 15 \text{ m}^2$ .

This Survey Area is posted as an Airborne Radioactivity Area. As per PRO-475-RSP-16.01, Table 1, RLC Survey Sample Requirements, no surveys/samples are required. Therefore, Survey Area E is considered contaminated.

### **Radiological Surveys**

As per PRO-475-RSP-16.01, Table 1, RLC Survey Sample Requirements, no surveys/samples are required.

### **Radiological Samples**

As per PRO-475-RSP-16.01, Table 1, RLC Survey Sample Requirements, no surveys/samples are required.

#### **4.7.1.2 Survey Area F (2000-002)**

This Survey Area includes Building 732 Pit exterior. The total surface area of the Survey Area is  $< 15 \text{ m}^2$ .

Radiological survey results indicate that radiological hazards are present. Survey results on roof/exterior walls indicate that a radiological hazard exists. Several radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area F can be considered contaminated.

### **Radiological Surveys**

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls  $< 2$  meters from the floor with associated swipes for removable alpha and beta-gamma activity and  $1 \text{ m}^2$  surface scans for alpha activity.

The following measurements were collected:

- 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls  $< 2$  meters from the floor with associated swipes for removable alpha and beta-gamma activity and  $1 \text{ m}^2$  surface scans for alpha activity.

Eleven of the 30 random/uniform (unbiased) total surface activity measurements on the roof/exterior walls  $< 2$  meters from the floor with associated swipes for removable alpha and beta-gamma activity and  $1 \text{ m}^2$  surface scans for alpha activity are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix I-2.

### **Radiological Samples**

The following measurements were specified in the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999:

- 1 biased (paint) media samples.

The following measurements were collected:

- 0 biased (paint) media samples.

One sample was to be collected where there was no paint, therefore, the sample was omitted.

### **4.7.2 Chemical Hazards**

#### **4.7.2.1 Lead and Other RCRA Metals**

Historical data and process knowledge do not give any reason to suspect metals contamination of the facility. Laundry wastewater did not contain significant levels of metals (i.e., any contamination would be below RCRA hazardous characteristic thresholds. No B776 deluge water was ever conveyed to B372. Therefore, no analysis was required for RLC.

No historical data exist for lead analyses in paint in Building 732. However, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream.

The laundry tank T-4 was permitted as RCRA unit 40.16 and requires RCRA closure.

#### **4.7.2.2 VOCs/SVOCs**

Historical data and process knowledge give no reason to suspect VOC or SVOC contamination of this facility. Laundry wastewater did not contain significant levels of organics, and no B776 deluge water was ever conveyed to B372. Therefore, no analysis was required for RLC.

#### **4.7.2.3 Beryllium**

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Historical data and process history give no reason to suspect beryllium contamination of this facility. The facility is not listed on the CBDPP List of Known Beryllium Areas (LKBA). No RLC analysis for beryllium was required.

#### 4.7.2.4 PCBs

Based on process and historical knowledge and building walkdowns, no PCB sampling of surfacial media was conducted nor warranted during RLC. However, even if PCB paints or coatings are present, Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, states that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b), and therefore, need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met.

#### 4.7.2.5 Asbestos

The presence of ACM within B732 was not been determined during RLC. Inspection by a CDPHE-certified asbestos inspector was not conducted because B732 is an airborne radioactivity area.

#### 4.7.3 B732 Hazards Summary

Table 4-25 summarizes B732 hazards.

Table 4-25 B732 Hazards

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	Yes; inside surfaces and equipment (internal and external), plus roof.
In-Process Nuc. Material	None
Nuc. Material Holdup	None
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	None
Chem./Haz. Waste Storage	None
Mixed Waste Storage	Yes, tank requires RCRA closure.
Chem. Product Storage	None
Asbestos	Unknown; not inspected; airborne radioactivity area.
Lead/Heavy Metals	None. No need for analysis for lead in paint unless it is to be scabbled.
Beryllium	None
PCBs	None
Other Chem.	None

Contamination	
Unique Physical Hazards	None

## 4.8 B707 Tanks

### 4.8.1 Radiological Hazards

The exterior of the B707 Tanks comprise Survey Area DD, which includes Tanks T-223 (Liquid Nitrogen), T-16 (Diesel), T209 through T221 and T-284 (Helium), T-208 (Liquid Argon), T-206 (Carbon Tetrachloride), T-290 (Diesel), T-324 (Diesel) and T-325 (Diesel). The total surface area of the Survey Area is  $< 1,000 \text{ m}^2$ .

Radiological survey results indicate that no radiological hazards are present. No radiological survey results are above the limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Survey Area DD can be considered non-contaminated. However, the tanks will be surveyed per property release evaluation requirements before they are released off-site.

No radiological samples were required for this Survey Area.

### Radiological Surveys

Radiological surveys were performed per the specifications of the RFETS Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, dated November 1999. The following measurements were specified:

- 44 total surface activity measurements on tanks and ancillary piping with associated swipes for removable alpha and beta-gamma activity.

The following measurements were collected:

- 38 total surface activity measurements on tanks and ancillary piping with associated swipes for removable alpha and beta-gamma activity. Eighteen out of 21 tanks plus T711 were surveyed as part of this survey area. There were two survey points per tank (i.e., the base of each tank plus piping associated with each tank). Three tanks were underground and could not be surveyed.

All 38 total surface activity measurements on equipment with associated swipes for removable alpha and beta-gamma activity are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The radiological survey requirements for this Survey Area, specified in PRO-475-RSP-16.01, were met or exceeded. Radiological survey results are summarized in Appendix J-2.

### Radiological Samples

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No radiological samples were required for this Survey Area.

#### 4.8.2 Chemical Hazards

##### 4.8.2.1 Lead and Other RCRA Metals

Historical data and process knowledge do not give any reason to suspect metals contamination of the tanks. The tanks contained/contain carbon tetrachloride, diesel fuel, argon, helium, liquid argon, and liquid nitrogen. Therefore, no analysis was required for RLC.

No historical data exist for lead analyses of the paint associated with the B707 tanks. However, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream.

##### 4.8.2.2 VOCs/SVOCs

One of the tanks (tank no. 206/building no. D-2) contained carbon tetrachloride. The tank was drained but not flushed, and therefore, it contains residual levels of carbon tetrachloride. Historical data and process knowledge do not give any reason to suspect organic contamination of the other tanks. The other tanks contained/contain diesel fuel, argon, helium, liquid argon, and liquid nitrogen. Therefore, no VOC/SVOC analysis was required for RLC.

##### 4.8.2.3 Beryllium

Historical data and process history give no reason to suspect beryllium contamination of these tanks. No RLC analysis for beryllium was required.

##### 4.8.2.4 PCBs

Based on process and historical knowledge, no PCB sampling of surfacial media was conducted nor warranted during RLC. However, even if PCB paints or coatings are present, Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, states that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b), and therefore, need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met.

##### 4.8.2.5 Asbestos

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Inspection by a CDPHE-certified asbestos inspector determined no potential asbestos-containing material.

#### 4.8.3 B707 Tanks Hazards Summary

Table 4-26 summarizes B707 tanks hazards.

**Table 4-26 B707 Tanks Hazards**

HAZARDS	HAZARD DESCRIPTION
Radiological Contamination	None
In-Process Nuc. Material	None
Nuc. Material Holdup	None
Other Rad. Mat'l (sources & product)	None
Rad. Waste Storage	None
Chem./Haz. Waste Storage	None
Mixed Waste Storage	None
Chem. Product Storage	Carbon tetrachloride, diesel fuel, argon, helium, liquid argon, and liquid nitrogen.
Asbestos	None
Lead/Heavy Metals	None
Beryllium	None
PCBs	None
Other Chem. Contamination	None
Unique Physical Hazards	None

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## 5.0 DECOMMISSIONING WASTE TYPES AND VOLUME ESTIMATES

After equipment has been removed from the facilities and the facilities have been decontaminated, the demolition of the B707 Cluster facilities will generate primarily uncontaminated rubble/structural construction debris, sanitary waste, and low-level radioactive waste. Most process-related equipment items, including ventilation systems, gloveboxes, and machinery are likely to be disposed of as low-level radioactive waste. The Site will be able to recycle most of the uncontaminated rubble/structural construction debris. A relatively small amount of waste will have to be disposed off-site as RCRA, PCB and asbestos containing waste. It is expected that most of the beryllium contamination will be decontaminated. The following table presents volume estimates by waste type.

**Table 5-1 B707 Cluster Waste Volume Estimates by Waste Type**

Category	Sub-Category	Units	Total Volume/Wt.
TRU	TRU	m <sup>3</sup>	1,111.63
	TRU Mixed	m <sup>3</sup>	211.27
	Residues	m <sup>3</sup>	2.10
	TRU Liquids	m <sup>3</sup>	0.0
Low-Level	LL incl. ACM	m <sup>3</sup>	2,163.91
	LL Structural Debris	m <sup>3</sup>	2,445.12
	LL Surface Contaminated Object	m <sup>3</sup>	10,659.15
	Contaminated Recycle Metal	m <sup>3</sup>	0.00
	LLW - Liquid	m <sup>3</sup>	0.00
Low-Level Mixed	LLM - RCRA	m <sup>3</sup>	86.76
	LLM - PCBs	m <sup>3</sup>	1.57
	LLM - Liquid	m <sup>3</sup>	2.6
Non-Rad/Regulated Hazardous/Toxic	RCRA	m <sup>3</sup>	4.07
	CERCLA	m <sup>3</sup>	0.00
	PCB	m <sup>3</sup>	7.32
	Friable Asbestos	m <sup>3</sup>	12.31
	Hazardous Liquid	m <sup>3</sup>	0.37
Sanitary	Routine Sanitary	tons	0.00
	Non-Routine Sanitary	tons	6,058.33
	Rubble/Structural Construction Debris	tons	0.00
	Non-Friable Asbestos	tons	22.50
Other	Salvage / PU&D	m <sup>3</sup>	0.00
	Rubble/Structural Construction Debris	m <sup>3</sup>	55,201.24
	Radiological Test/Calibration Sources	m <sup>3</sup>	0.00
	Non-Construction Scrap Metal/Recycle	m <sup>3</sup>	0.00

## 6.0 DATA QUALITY ASSESSMENT

Data quality is assessed relative to the purposes for which the data were taken. In the case of reconnaissance level data, the purpose of the data is to 1) characterize hazards to human health or the environment in the context of consequent strip-out/decommissioning activities and 2) classification, or "typing", of buildings (and areas within buildings) as a prerequisite to Pre Demolition activities. This section explains the means by which the data were verified and validated to attain the described goals of the project. Requirements for satisfactory data quality are given in applicable K-H corporate policies (e.g., K-H, 1997, §7.1.4 and 7.2.2) and DOE Order 414.1, Quality Assurance, §4.b.(2)(b).

Original DQOs were documented during the planning phase of the project (Integrated Work Control Package (Type-1), Work Control # IWCP T0102341; this IWCP included the *Radiological and Non-Radiological Characterization Package for the Building 707 Cluster*, Revision 0, Volumes 1 & 2. DQA was performed based on the following requirements and guidance documents:

- *Quality Assurance*, DOE Order 414.1
- *EPA QA/G-8 Guidance on Environmental Data Verification and Validation*, (Draft, August 1999)
- *Analytical Services General Guidelines for Data Verification and Validation*, DA-GR01-v1-1, Kaiser-Hill (RFETS), December, 1997
- *Verification and Validation Guidelines for Inorganics Analysis*, DA-SS05 (PSA Module SSO5), Kaiser-Hill (RFETS), December, 1997
- *Verification and Validation Guidelines for Isotopics Determination by Alpha Spectrometry*, DA-RC01 (PSA Module RC01), Kaiser-Hill (RFETS), February, 1998

In general, as discussed in the subsections below, data quality was satisfactory for the purposes of reconnaissance level characterization. All results are usable without qualification.

### 6.1 Verification/Validation

Verification of both radiological and non-radiological data set(s) corroborates that data produced and used by the project are documented and traceable per quality requirements. Specifically, verification confirmed the following:

- Format and content of the data are clearly presented relative to the project decisions.
- Measurements are properly authenticated, dated, and labeled, allowing clear traceability to measurement locations and responsible technical personnel.
- Calibrations and periodic performance checks of all instrumentation were satisfactory relative to accuracy, precision, and bias.

- Count times of radiological surveys produced adequate sensitivity of measurements for comparison with action levels.

Validation consisted of a technical review of data, particularly analytical data, to ensure that proper methods/procedures were implemented, including data reduction and calculations that resulted in data output. Based on this technical review, any limitations of the data relative to project goals were listed and explained.

DQA, through the V&V activities described above, is typically expressed in statistical terms and PARCC parameters. PARCC parameters -- Precision, Accuracy, Representativeness, Comparability, and Completeness -- also include discussion on bias and sensitivity. The DQA discussion herein emphasizes the PARCC aspects of the data, because only descriptive statistics were necessary for summarization and interpretation of radiological data. Likewise, statistical considerations were not applicable to non-radiological data (beryllium, asbestos, and PCBs), as contaminant detection was limited to biased samples whose locations were linked to process knowledge; random samples yielded no detection.

### 6.1.1 Precision

#### Radiological Surveys/Samples

Precision of the radiological survey instrumentation was satisfactory based on periodic (daily) source checks within tolerances as specified in 3-PRO-112-RSP-02.01, *Radiological Instrumentation* (Rev. 1, 8/24/98). The tolerance, within  $\pm 20\%$  of a source check value, applies to all survey measurement types -- scans and static measures for total contamination (TSA) and swipes for removable. Any performance checks that exceeded the defined tolerance limits were corrected (repaired or replaced) prior to the instrument's use in the reconnaissance survey. Daily source check results are maintained by Radiological Operations in Building 549.

Precision of laboratory radiochemistry was adequate based on acceptable results from laboratory replicate analyses. A ratio between the real result and the replicate result was compared with a test statistic to determine equivalency (stated differently, results were compared to determine if they were significantly different). All ratios sometimes called "duplicate error ratios" or "equivalency ratios" were within tolerance, and are reflected within the respected data packages attached in the Appendices.

#### Hazardous Constituents

Overall precision of (RCRA-characteristic) metals for the project was adequate based on results of the project's real/duplicate-pair below characteristic action levels for all metals of interest. Laboratory precision was also within tolerance based on relative percent difference (RPD) values between lab replicates.

Precision of beryllium results was adequate based on the same rationale given for the RCRA-characteristic metals discussed above, in addition to an occurrence of one real/duplicate sample pair that exceeded detection limits, but within an RPD range of 25%.

Repeatability of asbestos samples was not evaluated quantitatively due to the judgmental nature of the sampling approach and the method of analysis (polarized light microscopy).

### **6.1.2 Accuracy (And Bias)**

#### **Radiological Surveys/Samples**

Accuracy of radiological surveys is satisfactory based on RFETS-programmatic annual calibrations that establish instrument efficiencies and sensitivities for all instrumentation used on this project. Daily source checks also provided periodic checks to ensure that all sensors are within accuracy tolerances during daily operations. Calibration and calibration check results are within the RFETS and industry-standard requirement of 20% of the applicable reference standard values.

Accuracy of radiochemistry results is typically within 20% of full scale measurement, and about 1 pCi/g and  $\pm 1$  pCi/liter for all actinides of interest at or near contractually required minimum detectable concentrations (i.e., 0.3 pCi/g or pCi/l for  $^{241}\text{Am}$ ,  $^{239,240}\text{Pu}$ ; 1 pCi/g or pCi/l for the U species). Sample-specific accuracies are reported on the laboratory reports as a function of total error, which includes counting error. Accuracy of radiochemistry results was controlled through periodic laboratory calibrations and use of lab control samples. Recoveries of laboratory control samples (LCS) ranged from 92% to 115% of a spike standard at 8 pCi/l, well within the industry standard of  $\pm 20\%$  recovery of the reference standard value. Other quality controls, such as sample-specific yield percentages, are maintained in the original laboratory data packages managed by K-H Analytical Services Division in Building 881. Selected QC data, including those resulting from preparation blanks and LCS, are provided within the applicable Appendices, i.e., those including non-radiological data.

No biases were noted that would cause data to be qualified or rejected. Results from preparation blanks were at or below MDA values. Non-detection in blanks indicate that the potential for false positives, due to cross-contamination of samples, is extremely unlikely. Finally, neither dilutions nor matrix interference compromised accuracy of results.

#### **Hazardous Constituents**

Accuracy for (RCRA-characteristic) metals is adequate based on a variety of laboratory quality controls, including calibrations, serial dilutions ( $<10\%$  difference in actual and predicted concentrations), lab control samples (%recoveries analyte-specific), and matrix spike %-recoveries within  $\pm 25\%$  of the standard value. Blank samples yielded

non-detectable levels and thus potential cross-contamination or false positive results were not an issue. QC sample results are included with the data in Appendix C.2.1.4.

Accuracy of beryllium results is adequate for the project based on satisfactory LCS recoveries (% LCS recoveries) at 96% for the batch. Blank samples yielded non-detectable levels, and thus potential cross-contamination and false positive results are not an issue.

Accuracy for asbestos volumetric concentrations is based on the semi-quantitative technique of petrography via polarized light microscopy. Analysts can typically quantify components to within several percent at high concentrations ranging to ~1% at low concentrations (i.e., presence or absence of the mineral of interest). Accuracy for the project is adequate, as the contrast between 0% and 1% is a clear distinction for the decision of "ACM" vs. "No ACM".

### 6.1.3 Representativeness

Samples and surveys are representative of the materials and locations of interest based on the following criteria:

- Familiarity with facilities -- multiple walk-downs and collaborations by and within the sampling team;
- Use of approved and controlled procedures, including:
  - K-H Module RC01, Version B.3, Isotopic Determinations by Alpha Spectroscopy
  - K-H Module NR01, Version A, Beryllium Filters [including SW846 3051/OSHA ID-121 for Whatman filters and NIOSH 7300 for MCE filters]
  - K-H Module SS05 [including SW846 methods 1311 (TCLP), 3005A/6010A/6020B (total metals), and 7470 (Hg)];
  - RFETS, 11/99, Radiological and Non-Radiological Characterization Package for the Building 707 Cluster, Revision 0, Volumes 1 & 2
  - IWCP T0102341 (surveys)
  - IWCP T0102342 (samples)
  - Health & Safety Practices (HSP) Procedure 18.10, "Radioactive Material Transfer and Unrestricted Release of Property and Waste,"
- Analysis of samples within EPA recommended holdtimes.
- Use of a combination of both random and biased locations for survey/sample measurements; many of the radiological survey measurements were quasi-random,

in that a random number generator was not used, but points were uniformly distributed throughout the area of interest. Biased locations were intentionally clustered about areas where previous contaminant-related activities were known to exist.

#### 6.1.4 Completeness

Comparisons between *planned* sample and survey planning specifications (IWCP # T0100346, Rev. 0) with the actual quantity of usable sample and survey results allow an evaluation of completeness. Completeness of radiological data is adequate as explained throughout Section 4 and in the Appendices, where planned and actual data are listed and discussed by Survey Area. The totals and breakdowns of planned surveys were determined by Radiological Engineering professional judgement and consensus approval by Quality Assurance and management organizations.

Non-radiological data are complete based on the quantity of samples and surveys documented in the Appendices, which were compliant with the relevant controlled and approved planning documents (Section 6.1.3). As in the radiological context, sampling locations and frequencies were dependent on judgmental sampling resulting from site inspections performed by the characterization project team. Quality records for the data presented are complete based on data sets consistent with specifications in planning documents; these data sets are given in the Appendices.

#### 6.1.5 Comparability

All results presented are comparable with data of like contaminants of concerns on a site- and DOE-complex wide basis. This comparability is based on the following:

- Use of standardized engineering units in the reporting of measurement results;
- Use of documented and approved plans and procedures; and
- Thorough documentation of the planning and sampling/analysis processes, and data reduction into formats designed for making decisions based on the project's original DQOs.

#### 6.1.6 Sensitivity

Sensitivities for all surveys and chemical analyses are adequate, based detection limits and MDAs at levels well less than DQO decision criteria. Sensitivities for each analytical method are provided with the sample results in their respective Appendices.

### 6.2 Summary

The data presented in this report have been verified and are qualified as valid and complete for comparison with applicable decision criteria relative to each contaminant of concern. All data sets (by location and analytical suite) comply with the Reconnaissance Level DQOs, which support initial waste estimates and classification (for continuing D&D) of buildings with the 707 Cluster as defined in this report.

## 7.0 FACILITY CLASSIFICATION

Based on the analysis of radiological, chemical and physical hazards, the B707 Cluster facilities were classified pursuant to the RFETS Decommissioning Program Plan (DPP, K-H, 1998a). Classification was based on a review of historical and process knowledge, historical radiological and chemical data, and newly acquired RLC data. Results indicate the presence of radioactive contamination associated with B707, B778, B731 and B732. Contamination is present on building surfaces (e.g., floors, walls and/or roof), and on and inside equipment and building systems (e.g., gloveboxes and ventilation ducts). Some B707 areas and equipment/systems have high levels of contamination. Elevated readings were also found on the roofs of B708 and B718. Beryllium contamination is present in Modules F and G of B707, and beryllium is present in several of the B707 gloveboxes and equipment (e.g., in Modules A, F, G, H, and J), as well as in B707 piping and the second floor plenums. The Kathabar systems on the second floor of B707 also may be contaminated with metals (e.g., lead and chromium). Asbestos-containing material is present in three of the cluster buildings (i.e., B707, B778 and B708) in several forms (e.g., floor and ceiling tile, other building materials, and insulation). There are no other significant chemical or physical hazards.

### FACILITY

### CLASSIFICATION

Building 707	Type 3
Building 778	Type 2
Building T707S	Type 1
Building 708	Type 2*
Building 711	Type 1
Building 771A	Type 1
Building 718	Type 2*
Building 731	Type 2
Building 732	Type 2
B707 Cluster Tanks	Type 1**
Carbon Tetrachloride Tank	Type 2

\*Contamination type to be confirmed; activity may be from naturally occurring radioactive material – not DOE-added material.

\*\*Except the carbon tetrachloride tank.

Pre-demolition surveys or property release evaluations will be conducted on the Type 1 facilities and exterior tanks within this Cluster before they are dispositioned.

## 8.0 REFERENCES

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